Introduction: Perception, Emotion, and Language

This part of the book describes some novel perspectives on the connection between mental models and perception, emotion, and language. The main question is whether the general picture outlined in the first parts of the book also helps to understand mental phenomena other than reasoning and learning. The answers are quite different: Mental models seem to provide a very promising framework for emotions, but the case of visual perception calls for further refinements and additional theorizing. Furthermore, syntactic and semantic processing of natural language challenges some of the basic ideas of mental model theory.

The first contribution investigates the place of mental models in visual perception. We perceive the space around us as Euclidean and three-dimensional. In order to do so, several depth cues are evaluated to transform the two-dimensional retinal picture into a three-dimensional representation. Rehkämper discusses the case of visual picture perception, where the perceived object is already two-dimensional. According to Rehkämper, if mental models are analogical representations of the space around us, three-dimensional models in perception should be Euclidean as well. However, empirical evidence makes questionable whether the perceived space has a geometry at all. At least, it seems quite certain that it is not Euclidean. Hence, if mental models play a role in perception at all, it has to be explained how a Euclidean model can be constructed on the basis of non-Euclidean representations. One possibility is the technique of modified weak fusion, which would have to operate at an unconscious level. But even if there is such a mechanism, there are differences between perceptual models and models used in reasoning: the former are transparent and cannot be modified, the latter are opaque and modifying them is essential for reasoning. Therefore, a unified account of mental models in perception and reasoning faces several serious problems, the solution of which requires
much further refinement of the theory.

The interdependence of emotion and cognition is becoming more and more evident from recent empirical research in different areas. Yet, the characterization of emotions in terms of a representational theory of mind does not seem to be satisfactory. **Pauen** develops three constraints for such a representational theory of emotions, based on a review of recent empirical findings. First, similar emotions are evoked in similar situations, which fact suggests a “similar input - similar output” principle. Second, representations of emotions have to be dynamic, since not only situations but primarily (outcomes of) processes are emotionally evaluated. Third, emotions are multi-modal, i.e. one emotion can be triggered by inputs of different modalities. Mental models meet all of the three constraints. Hence, they are much more suitable for a representational theory of emotions than symbolic theories. Moreover, mental model theory is developed for the realm of cognition, such that the interaction of cognition and emotion could be easily described if the underlying representations were of the same kind. Pauen concludes that mental models are the most promising framework for a theory of the interdependence of emotion and cognition. Further empirical research will provide details to fill in the rather metaphorical character of the theory so far.

If we think about the world in terms of mental models it seems reasonable to assume that syntactic and semantic processing of natural language is constituted by the construction of such mental models. **Hemforth & Konieczny** show that such an eliminative view (that denies that other mechanisms and representations are involved) must leave unexplained a large amount of data. In particular, preferences for certain interpretations of ambiguous sentences are dependent on different syntactical and contextual factors as well as on background knowledge. The parsimony principle for mental models cannot explain the diversity of effects. Moreover, the representation of numbers is hardly captured by mental models: It is unclear how vague quantifiers (e.g. “quite a lot”) and exact large numbers could be represented within mental models. Additionally, anaphora resolution in texts seems to be dependent on several semantic as well as syntactic levels of representation. Assuming only mental models does not suffice. All in all, mental models cannot be the (exclusive) basis for syntactic and semantic processing. Different levels of processing have to be assumed. Moreover, in order to determine the place of mental models in this hierarchy of representations, much more detailed constraints have to be added to the general picture.