

Introduction:

Sensory Motor Concepts – at the Crossroad between Language & Cognition

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This book presents selected papers from the conference “Sensory Motor Concepts in Language and Cognition” organized by the DFG Collaborative Research Center 991: “The Structure of Representations in Language, Cognition, and Science” and held from December 01–03 at the University of Düsseldorf, Germany. It brings together researchers working in the fields of computer linguistics, linguistics, literary, neuroscience, philosophy and psychology, whose work contributes to the interdisciplinary study of cognitive phenomena, specifically in the exploration of the role of sensory motor concepts for language and cognition in general. The aim of this book is to uncover hidden potentials and available prospects of inter and trans-disciplinary research in the field of sensory motor concepts by defining common interests and objectives, and sketching paths for a fruitful interdisciplinary cross-fertilization, cooperative projects, and research transfer.

What is so fascinating about sensory-motor concepts?

According to Barsalou, mental representations used in cognitive tasks are grounded in the sensory-motor system. Therefore it is assumed that the human system of concepts cannot be regarded as either abstract or amodal, but as immediately anchored in the perception, experience and simulation of sensory-motor actions (Barsalou, 2008). This assumption is supported by the following facts: a) sensory-motor knowledge is the most specific and best-differentiated concrete human experience we possess, and b) sensory-motor concepts are not only conceptually simple and easy to encode given the fact that they are part of our everyday life, but due to their semantic complexity they can

also function as cognitive anchorage points for a diverse range of encoding strategies. Therefore, it comes as no surprise that we use sensory-motor concepts as a model for less specific, less differentiated, more abstract knowledge, such as emotions, needs or temporal and spatial relations. The mere fact that even the words to UNDERSTAND and to COMPREHEND (< Latin *prehendere* ‘to catch, to seize’) can be traced back to sensory-motor concepts and that we use sensory-motor-based metaphors, such as to GRASP *an idea* or to HANDLE *a problem* underlines the predominance of sensory-motor source domains in the lexicon. But grammar, too, is full of morphemes which can be traced back to sensory-motor activities. One example is the way we refer to time, e. g. French *le PASSÉ* ‘the past’ (something that has gone by), *MAINTENANT* ‘now’ (< Latin *manu tenendo* ‘in the hand holding’) and *l’AVENIR* ‘the future’ (< Latin *advenire* ‘still to come’) or that we encode emotions or feeling with the help of a possessive verb related to hand action, such as *I HAVE concerns*, etc. Many light verbs and auxiliaries can also be traced back to hand or food actions, such as to GIVE *a smile*, to TAKE *a walk*, or *I am going for a swim*, etc. Similar the copulae in Spanish can be traced back to bodily positions (e. g. *SER* [< Latin *sedere* ‘to sit’] or *ESTAR* [< Latin *stare* ‘to stand’]) or the negation in French to the denying of an action, such as to not TAKE *a STEP* (*ne ... pas* ‘not a step’), etc. (Ströbel, 2010, 2011). In all these examples the underlying strategy is based on the fact that not only the same brain areas are activated whether we fulfill or just imagine an action, but that we can also imagine a sensory-motor task, such as grasping an object without actually grasping it (Gallese and Lakoff, 2005) and that is exactly what makes sensory-motor concepts so suitable for rendering abstract entities less abstract by connecting them to concrete bodily actions (Ströbel, 2014).

The linguistic perspective is covered by theories in cognitive science which support this assumption by asserting that many concepts are grounded in sensory-motor processes (Barsalou, 2008; Gibbs, 2005; Pezzulo et al., 2011; Wilson, 2002). Psycholinguistic studies confirm that different sensorimotor experiences directly shape people’s use and understanding of complex situations and metaphorical statements. Neurological studies using neuroimaging techniques (e. g. fMRI, EEG) and also patient studies (Grossman et al., 2008) have furthermore provided several pieces of the puzzle concerning auditory language perception, reading and language production and deliver valuable insights into this highly developed cognitive function.

The interdisciplinary interest in the topic is also reflected in this volume. Looking at the subject from a number of different perspectives, the various contributions here elaborate the fact that language and body are closely interrelated.

Sensory-Motor Concepts and Language

The close connection between sensory-motor concepts and language is illustrated in the first part of this volume: **Raymond Gibbs** points out that much of everyday cognition and language has its roots in ongoing bodily experience. In his article, he describes a number of studies from the fields of experimental psychology and corpus linguistics and illustrates how metaphoric ideas and talk emerge from embodied simulation processes. **Valentina Cuccio** purposes a usage-based model of language. Taking the idea that speaking is acting as a starting point, she uses studies on action understanding in order to clarify language production and comprehension and to explain how inferential meaning is deduced from literal sentences. The close connection between sensory-motor concepts and metaphor is discussed by **Johann-Mattis List, Anselm Terhalle and Daniel Schulzek**. Analyzing traces of embodiment in Chinese character formation, they underline the complex interactions between speaking, writing, and meaning. **Wolfgang Müller's** approach starts from the assumption that – much like emotions in actual life – emotions in literature are also grounded in the kinesthetic experience of the body. In his contribution, he illustrates that literature is a productive field for experimentation in matters of embodied cognition.

The diversity of Sensory-Motor Concepts and its implications

The diversity of sensory-motor concepts and its implications is highlighted in the second part of this volume: **Gerard Steen** divides the group of sensory-motor concepts into five subgroups, namely motor concepts, sensory concepts, sight concepts, sound concepts, location and direction concepts. Furthermore, he also points out that the different groups of sensory-motor concepts are preferred in different registers and that a complete study of sensory-motor concepts would involve a four-way interaction between sensory-motor concepts, metaphor, word class, and register. **Ralf Naumann** outlines a theory of action verbs that combines an abstract, modality-independent component with a modality-specific component located in certain regions of the premotor cortex. His proposal is based on the observation that a verb like *kick* can be used to express diverse types of actions that differ with respect to parameters (e. g. telic vs. atelic, result vs. no result or atomic vs. iteration). **Sander Lestrade** addresses the question whether we should analyze “place”, a generalized location, expressing the absence of a change of location, on a par with mode expressions specifying the type of such a

change, i. e. “source” and “goal”. In his paper, he discusses the status of place markers in a cross-linguistic sample of spatial-case inventories. **Andrea Bellavia** focuses on the connection between aspectuality and embodiment by analyzing a specific class of idiomatic constructions which systematically denote a change of location undergone by a body part at the source domain and which is metaphorically projected into the target domain denoting an event carried out in an intensive fashion. He is advancing a two-level integration model in order to display the semantic compositional representation of such idiomatic constructions.

Sensory-Motor Concepts and Perception

The close connection between sensory-motor concepts and perception is the focus of the last part of this volume: **Lionel Brunel, Denis Brouillet and Rémy Versace’s** approach is based on the close link between memory and perception and analyzes the influence of an auditory memory component upon the sensory processing of a sound by demonstrating the strong linkage between the access to our memory and the reactivation of the relevant sensory components, as part of the function of the respective context or the task. **Martin Butz and Daniel Zöllner** argue that progressively complex concepts and compositional structures can be developed starting from very basic perceptual and motor control mechanisms. They propose that the innateness of concepts may not be directly genetically imprinted, but concepts and compositional concept structures may be indirectly predetermined to develop due to the ontogenetic path laid out in the genes of the organism, the morphological constraints given by the body of the organism, and the environmental reality with which the organism interacts. **Alex Tillas** investigates the relationship between natural language and thinking. He takes as his starting point the assumption that thinking is imagistic, to the extent that conceptual thoughts are built out of concepts which, in turn, are built out of perceptual representations; and that concepts – the building blocks of thoughts – are association-istic in their causal patterns. His claim is supported by independent empirical evidence obtained from work done with aphasic subjects.

References (Preface & Introduction)

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