

## Abstract

This book is about the interface between natural language and the sensorimotor system. It is obvious that there *is* an interface between language and sensorimotor cognition, because we can talk about what we see and do. The main proposal in the book is that the interface is more direct than is commonly assumed. To argue for this proposal I focus on a simple concrete episode—a man grabbing a cup—which can be reported in a simple transitive sentence (e.g. the English sentence *The man grabbed a cup*). In the first part of the book I present a detailed model of the sensorimotor processes involved in experiencing this episode, both as the agent bringing it about and as an observer watching it happen. The model draws on a large body of research in neuroscience and psychology. I also present a model of the syntactic structure of the associated transitive sentence, developed within the entirely separate discipline of theoretical linguistics. This latter model is a version of Chomsky’s ‘Minimalist’ syntactic theory, which assumes that a sentence reporting the episode has the same underlying syntactic structure (called ‘logical form’) regardless of which language it is in. My main proposal is that these two independently motivated models are in fact closely linked: specifically, that the logical form of the sentence reporting the cup-grabbing episode can be understood as a *description* of the sequence of sensorimotor processes involved in experiencing the episode. I argue that the logical form of the sentence can be given a detailed sensorimotor characterisation, and, more generally, that many of the syntactic principles which are understood in Minimalism as encoding innate linguistic knowledge are actually sensorimotor in origin. This reinterpretation of Chomskyan syntax places it squarely within mainstream cognitive science. In fact, I suggest it offers a way of reconciling Chomskyan syntax with the empiricist models of language which currently dominate the field. In particular, it permits the development of a model of language *processing* which is compatible with Minimalism (which in its original conception just a model of ‘syntactic competence’). I conclude the first part of the book by presenting a neural network model of sentence production, whose basic recurrent architecture should be familiar to empiricist linguists, but which can also be understood by Minimalist linguists as a model of the mechanism which learns a mapping between the logical form of sentences and their surface form in a particular language. The network can learn the kind of syntactic parameter settings which Minimalists assume are responsible for the differences between languages; but it can also learn the statistically-defined surface patterns which play a prominent role in empiricist models of language, and which are problematic for traditional Minimalism.

In the second part of the book, I move beyond the simple cup-grabbing scenario, and extend the sensorimotor interpretation of Minimalist logical form to a number of other syntactic topics, including the internal syntactic structure of noun phrases, the noun-phrase/clause interface, predication, quantification and relative clauses.