

**Bartsch, Renate. 2002. *Consciousness Emerging: The Dynamics of Perception, Imagination, Action, Memory, Thought and Language*. Amsterdam/Philadelphia: John Benjamins.**

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As its title already suggests, the 39<sup>th</sup> publication in the *Advances in Consciousness Research* series, *Consciousness Emerging: The Dynamics of Perception, Imagination, Action, Memory, Thought and Language*, offers a large-scale point of view covering many phenomena of higher level cognition. In her attempt to explain how the brain brings about all these phenomena and how they are interrelated, the author draws from many sources in consciousness research: neuro-cognitive, cognitive psychological, philosophical, and linguistic. The main thesis of the book is that it is an interaction between primary sensorial fields and conceptual maps in synchronized circuits of activation, called 'episodic maps', that gives rise to consciousness. Bartsch argues convincingly not only for the view *that* the workings of neural networks in perception and understanding can bring about expressions in consciousness, but, more importantly, also *how* this can happen. Furthermore, exploring consciousness from a functional perspective, Bartsch provides the reader with an interesting account of "the hard problem", namely *why* certain oscillations in relevant cortical areas should be accompanied by consciousness, and hence goes beyond ideas presented for example in Crick and Koch (1990, 1992) and other neurobiological positions that aim at identifying neuronal correlates of consciousness.

## **Contents**

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The book is divided into three parts: The first part (consisting of chapter 1) presents five thought experiments based on the phenomenon of blindsight to illustrate the differences between a) reception and perception, b) causal semantics and denotational semantics, and c) linguistic ability and linguistic analysis. It is argued that consciousness is needed to make possible a denotational semantics, a notion of truth and reality, and the formulation and following of (flexible sets of) rules and norms. Bartsch considers the most prominent function of consciousness to be the entertainment of representations that can be evaluated from different points of view, allowing processes of comparison and judgment of experienced or imagined situations. The author also stresses the importance of consciousness and intentionality for language, and by extension, human-like intelligence. In order to create what Dreyfus

(1979) called 'artificial reason', it is not enough to build systems that can produce intelligent behavior, say linguistic behavior, it is also necessary to develop systems that are aware of the fact that they are indeed *using* language.<sup>1</sup>

The second part (chapters 2, 3, and 4) introduces Bartsch's logico-philosophical account of understanding, i.e. 'Dynamical Conceptual Semantics' (cf. Bartsch 1998), which is then employed to formulate the desired structural properties of semantically adequate neuronal networks. She discusses the problems of systematicity and binding in models that use only a single map of hidden units, i.e. a single map for generalization of recurrent input data, and shows that they are indeed insufficient to meet the semantic desiderata. This, in turn, motivates the contents of chapter 3, which can be considered the central chapter of the book. Here it is argued that all consciousness is episodic and realized as synchronized circuits of activation involving conceptual maps and sensorial fields, called 'episodic maps'. The chapter presents an architecture of neural maps, capable of modeling the critical aspects of perception and understanding discussed in the previous chapter. Chapter 4 discusses the relationship between understanding and interpretation (in the modeltheoretic sense) and argues that "thinking presupposes consciousness, because it deals with representations and their evaluations, in inference and judgment" and shows that "this leads to the assumption that thinking has to take place in the medium of imagery and language" (page 165).

The third and last part (chapter 5) highlights some crucial implications of the account and addresses four controversial issues in consciousness research, namely, first, the question of whether consciousness should be viewed as an internal or external monitoring device of brain states; second, whether all conscious states involve thought or judgment, third, whether there are different types of consciousness, and finally, fourth, whether there is a one-to-one correspondence between certain (types of) brain states and conscious states.

## Comments

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When I started reading the book, I was a little surprised by the relative ordering of the materials to be presented: To start with five thought experiments revolving solely around blindsight seemed unusual

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<sup>1</sup> I would like to point out that, at this stage, Bartsch does not explicitly make the extension from language to human-like intelligence, nor does she speak about 'artificial reason'. These additions are mine. However, a little later in the text, she argues that consciousness and intentionality are prerequisites for cognition and knowledge (pages 60 ff.).

for a book whose title suggested such a broad scope. Reading on, however, I quickly appreciated these experiments and the fact that they are used as an opener, since they are indeed well suited to introduce some of the main theoretical punchlines. The overall structure of the book is very clear, taking the reader from a foundational philosophical argumentation to a detailed conceptual—yet not too technical—description of the workings of the account, before it finally deals with some interesting theoretical implications thereof.

The book is not exactly an “easy read” as the sheer amount of technical vocabulary—with all its associated theoretical background—is presented through rather complex language. However, it is not the aim of the book to present a general, introductory overview of contemporary consciousness research. The series is clearly directed at a more advanced audience. This being said, the style of the book actually is one of its merits, since the alert reader will appreciate the consistent and carefully developed terminology. Whenever Bartsch departs from what might be considered conventional usage of theoretical terms, she provides a clear idea of why this was done and what is gained by it. For example, she uses the term 'episodic memory' instead of 'declarative memory' to avoid the conjecture that this kind of memory is necessarily expressed in language. Similarly, Bartsch characterizes the notoriously difficult notion of a concept as a *capacity* of the neuronal system. Thus, instead of talking about concepts, she talks about '*conceptual ability*'. This is not just “playing with words”, but of theoretical consequence, for concepts in this account are *not* identified with activation patterns on conceptual maps but are “merely implicit in the distribution of the weights of neuronal connections and their relation to sensors” (page 140) .

The general approach presented in Bartsch (2002) is both innovative and, as far as I can see, theoretically sound. It is antagonistic to classical models of human cognition, which assume that there is a central unit of rational reasoning and peripheral perceptual and motor modules. In contrast to such models, it emphasizes the idea that “perception and motor behavior [is] central for cognitive abilities[...]" (p.84). This, however, is explicated only in passing and reveals that Bartsch considers this to be the accepted view and not something that needs to be excessively argued for at this point. Readers looking for an exhaustive discussion of classical and non-classical models of cognition may, for example, turn to Marcel and Bisiach (1988) for a more classical perspective and Damasio (1999), which emphasizes embodiment and emotion. Such a non-classical view of human cognition, and with it the experiential level of concept formation, is, of course, very salient in cognitive linguistics and recent work in the general field of the psychology of language (cf., e.g., Zwaan and Radvansky 1998,

Barsalou 1999, Bergen and Chang 2003). Although there is no explicit reference to these works, the perspective presented in Bartsch (2002) is very related in spirit—drawing from many of the same neuro-cognitive sources (e.g. Fadiga and Gallese 1997, Saffran and Sholl 1999)—and is beyond doubt very rewarding to have a closer look at.

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