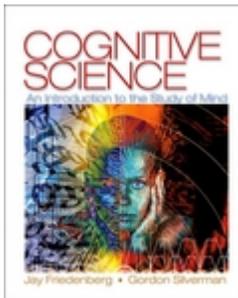


Affective and Social Aspects of Cognition: Implications for a Possible Future Cognitive Science

A review of



Cognitive Science: An Introduction to the Study of the Mind

by Jay Friedenberg and Gordon Silverman

Thousand Oaks, CA: Sage, 2006. 560 pp. ISBN 1-4129-2568-1. \$59.95

Reviewed by

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The relatively new interdisciplinary study of mind and intelligence, called cognitive science, is a rubric for a multiplicity of associated disciplines and subdisciplines, including philosophy, psychology, neuroscience, computer science, artificial intelligence, linguistics, evolution, and anthropology. Cognitive science is an empirically motivated discipline that endeavors to answer questions related to epistemic access and justification relative to the knower and objects to be known. Its intellectual origins were in the mid-1950s, when researchers in several fields began to develop theories of mind based on complex representations and computational procedures.

Jay Friedenberg and Gordon Silverman, in *Cognitive Science: An Introduction to the Study of the Mind*, offer a basic overview of current cognitive science. The authors aim to

provide the reader an introduction to the major theoretical contributions of a selection of cognitive science disciplines. Instead of an exhaustive documentation of research findings, they describe the theories of mind that have been developed in the selected disciplines. The overall presentation of the material is at a level that is easily accessible to undergraduate students who are unfamiliar with the problems raised. In particular, for persons beginning the study of cognitive science, the discussions are adequate in most respects.

The authors define a theory of mind as a unique, organized set of ideas that instructs persons how to think about the mind and details how information is represented and computed by a particular process. Matters raised in this discussion are essential and engaging. After identifying and examining the material of this book, I estimate the accomplishment of the authors' overall introduction to cognitive science.

Friedenberg and Silverman present multiple chapters discussing cognitive science from a wide array of fields. From each field, they attempt to present cognitive science's unique set of tools and perspectives. A self-proclaimed major goal of their book is to show that

when it comes to studying something as complex as the mind, no single perspective is adequate. Instead, intercommunication and cooperation among the practitioners of these disciplines tell us much more. The term cognitive science refers not so much to the sum of all these disciplines but to their intersection or converging work on specific problems. In this sense, cognitive science is not a unified field of study like each of the disciplines themselves, but a collaborative effort among researchers working in the various fields. The glue that holds cognitive science together is the topic of mind and, for the most part, the use of scientific methods. (p. 2)

Friedenberg and Silverman discuss cognitive science and cognition in terms of representation (digital representations, analog representations, the dual-coding hypothesis, and propositional representations) and computation (the trilevel hypothesis and classical and connectionist views of computation). According to Friedenberg and Silverman, representations are physical objects or states that symbolize some other material object or state. They describe four essential characteristics of any representation: (a) a "representation bearer," (b) content—meaning that the representation stands for one or more objects, (c) referents—things in the external world that a representation stands for, and (d) interpretability—the representation must be interpretable by some interpreter. The authors discuss these and other characteristics of representations. They address computation in terms of the classical formal systems approach, in which knowledge is represented locally (e.g., symbols), and the connectionist view, in which knowledge is represented throughout the network as activation patterns or weights.

The book is organized to include separate chapters for each disciplinary approach to the mind. The authors describe each approach in terms of what makes it distinct. They

emphasize major ideas of each perspective and the problems each attempts to solve. Next, they present background information that they consider is essential and describe each approach's methodology. A careful reading of these chapters will provide readers with a summary of the major categories of mental processes, including visual pattern recognition, attentional processing, memory functioning, imagery, and problem solving. For students, a superlative aspect of this text is its inclusion of a matrix (pp. xviii–xxii) that details the primary and secondary topics, methodologies, and major figures and gives an evaluative summary for discerning similarities and differences across disciplines.

Analysis of Friedenberg and Silverman's *Cognitive Science* Presentation

This book offers an up-to-date and accessible overview of the current disciplines involved in cognitive science. This work is accessible to readers regardless of experience and is indispensable for those interested in the teaching cognitive science for cross-disciplinary courses. Although Friedenberg and Silverman's emphasis on representation and computation is useful for elucidating various features of problem solving and cognition, their text could have been improved by increased discussion of the important role that emotions and physical environments play in cognition. A number of researchers are now investigating cognition through evaluation of the brain mechanisms underlying affective processing in healthy individuals and persons with affective disorders (LeDoux, 2000; Panksepp, 1998; Rolls, 1999). A cognitive science that takes seriously the impact of affect and mood on representation and computation may better explain epistemic access and justification (LeDoux, 1996). Although the decomposition of cognitive processes into more basic constituents has been extremely successful, the inclusion of affect may help cognitive science develop a more focused understanding of healthy and pathological functioning (Davidson, Jackson, & Kalin, 2000).

Furthermore, cognition is inherently social in ways that Friedenberg and Silverman's cognitive science text seems to ignore. Unfortunately, the authors fail to include a good deal of current work in cognitive science because they assume an incomplete view of cognition. A more developed understanding of cognition would address such complexities as affect, motivation, and psychopathology. In addition to attempts to understand and explain cognition, it would have been nice to see more discussion of the ways cognitions are influenced by the actual, imagined, or implied presence of others. A number of researchers have begun to move beyond analyses limited to information-processing mechanisms and are now including investigation of socioemotional cues, contexts, experiences, and behaviors (Adolphs, 2003; Ochsner & Lieberman, 2001). Research has shown that persons' cognitions

about other persons entail responses that thoughts about other objects do not (Mitchell, Heatherton, & Macrae, 2002).

The importance of social and cultural influences on understanding cognition may be illustrated through studies of persons with disrupted ability to represent and compute information. In instances such as traumatic brain injury, social processes as well as cognitions are profoundly affected. For example, persons with lesions in the amygdala and associated inferior portions of the temporal cortex (Klüver–Bucy syndrome) no longer exhibit fear and display inappropriate sexual activity (Ono & Nishijo, 1992). A further example is that of prosopagnosia, in which bilateral lesions in the occipital lobes result in an inability to recognize faces (Kanwisher, 2000). Although Friedenberg and Silverman do mention neurological deficits such as prosopagnosia, they discuss them in terms of recognition deficits and disregard the ways an inability to recognize the faces of people one once knew affects social relationships and subsequent cognitive schemas.

The text might have been aided by case studies, such as the historical case of Phineas Gage, who was a competent and responsible railway construction worker who suffered severe damage to the ventromedial aspects of the most anterior portions of the frontal cortex in the left and right hemispheres (Haas, 2001). This brain damage resulted in significant changes in his personality and temperament. The social relationships that he had prior to the accident deteriorated thereafter (A. Damasio, 1994). This case suggests that although cognition may be disrupted in brain injury, there are specific cognitive processes that may be better represented through models that include discussions of emotion and social relations.

In Summary

Cognitive Science offers a well-developed summary of the major theoretical disciplines involved in cognitive science. Friedenberg and Silverman have written a clear and comprehensive text that will be an invaluable guide for both students and cognitive science teachers. This work offers an engaging, informative, and up-to-date discussion of both the historical development and the current practice of cognitive science.

However, a more fully developed discussion of the structures involved in affective and social aspects of cognition would have aided the text. Although Friedenberg and Silverman's emphasis on representation and computation is useful for elucidating various features of problem solving and cognition, their text might have been improved by increased discussion of the important role emotions and physical environments play in cognition. A cognitive science that takes seriously the impact of affect and mood on representation and computation may better explain epistemic access and justification.

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