

BOOK REVIEWS

Spatial Biases in Perception and Cognition. By Timothy L. Hubbard. 2018. Cambridge University Press: Cambridge, UK. ISBN: (Hardcover) 978-1107154988. US \$140.00. 483 p.

Spatial Biases in Perception and Cognition provides an in-depth examination of spatial biases and how they infiltrate a wider range of disciplines and fields than previously thought. The book has a relatively narrow range for its intended audience, consisting mostly of researchers and experts interested in perception, cognition, and the relationships between physical stimuli and mental responses, or psychophysics. The material is technically advanced and requires a strong background in psychology and understanding of spatial relationships. However, the book is structured to allow for some accessibility to the content by creating a narrative type progression, beginning with an introduction to spatial biases followed by prevailing theories in the field both from the past and present and concluding with how the frameworks are used to understand the effect of a person's ability to perform an action on perception, especially in social contexts. Each chapter in the book was written by authors specializing in certain subtopics within the field.

The book is organized well, encompassing a wide breadth of research and theories of mechanisms accompanied by historical context. It has 24 chapters, separated into four sections that build toward the central theme of how actions and perceptions interact. The graphs and figures that visually clarify some of the more complex concepts explored contributes to the overall readability of the book.

The first section of the book describes perceptual biases with an emphasis on the idea of asymmetries and illusions. Visual and auditory stimuli are equally important when considering the perception of spatial relations. Use of both spatially oriented language and nonlinguistic spatial information can create a more complete observation of space than language in isolation. The second section focuses on competing theories of perception, more specifically the phenomena of moving objects and the variables that lead to cognitive misinterpretation of origin and end points. The idea that spatial biases lead to technically inaccurate perceptions of object movement is somewhat misleading. The biases that we experience in visual motion perception and distance of objects are most likely shaped by evolutionary selective pressures. The

third section expands upon the idea that language alone is not sufficient in describing space, but can be improved by hierarchical and categorical information with respect to different cognitive factors. The fourth section explores a more applications based approach to perception, discussing the implications of spatial biases in the context of social cognition and the social aspects of space such as stereotyping and social status.

The editor of this book did a commendable job of curating a wide range of works within topics such as spatial biases and cognition science, despite the inherent difficulty of the subject matter. Though the book presents a number of high-level theoretical frameworks and terminology, the book is adequately accessible by providing plenty of tangible examples. It would be a valuable read for social and behavioral science graduate students, new and experienced researchers, and anyone who is interested in addressing social issues that arise from the structure of spaces.

Anthony Chui
 Department of Epidemiology of Microbial Diseases
 Yale School of Public Health, Yale University

How Brain Arousal Mechanisms Work. By Donald Pfaff. 2019. Cambridge University Press: New York, NY. ISBN: (Hardcover) 978-1108433334. US \$32.00, 122 p.

Describing consciousness as a physiological phenomenon has been a challenge for neuroscientists. In *How Brain Arousal Mechanisms Work*, neuroscientist Donald Pfaff presents his theoretical ideas on the organization of brain arousal systems that he names, "Generalized Arousal (GA)". The main purpose of the book is to offer explanation of the mechanisms of brain arousal toward physical consciousness so that it can be applied for treatment purposes.

Pfaff criticizes Giulio Tononi's "integrated information theory" of consciousness as lacking mechanisms of pathways in the CNS, and neither "information" nor "integration" mentioned in his theory are well defined. He further describes Tonini's theory as a "top-down" approach in which overall abstract details of a system are established first so that experiments can be conducted within the framework. However, Pfaff approached his