

Preface

This book had its beginning several years ago in a discussion between the eventual editors concerning the recent arborescent growth in the field of binocular rivalry. Not only was the number of published papers increasing (approximately doubling each five years over the last fifteen-year period), but the range of experimental techniques was expanding. Among other things, this had led to new insights into the neurophysiological substrates of binocular rivalry, which in turn generated new theoretical speculation concerning the nature of rivalry and its relation to other forms of perceptual multistability. We concluded that the time was ripe for a book on binocular rivalry, to weave these threads together into a single reference volume with chapters authored by leading figures in the field. In considering potential contributors, we decided a more stimulating book would be produced if we could first bring the intended contributors together for a workshop, so that ideas contained in the potential chapters could be presented and discussed in an informal, lively environment.

With this goal in mind, we set about organizing such a meeting. The result was the San Miniato Workshop on Binocular Rivalry and Perceptual Ambiguity, held in Italy in June 2002 in the wonderful surrounds of a sixteenth-century former monastery. The three-day retreat into the Tuscan hills proved a fertile time. Nearly all the principal workers in binocular rivalry were present, and enthusiastic, vigorous discussion followed each presentation. Moreover, all participants then prepared written chapters built around their presentations, including amendments and new ideas that emerged during the course of the lively meeting. Those chapters were carefully edited by the two of us, the aim being to integrate common themes among chapters and to promote continuity of style. You the reader will judge the success of our endeavor.

As documented in the first two chapters, the phenomenon of binocular rivalry has been known for several centuries, and has been a part of experimental psychology for at least one hundred years. This book is by no means the first dedicated to binocular rivalry and related phenomena; however, it is the first for many years. The last two books dealing exclusively with binocular rivalry were Levelt's influential monograph published in 1968 and Leon Lack's dissertation published in book form in 1978. For most of the intervening years, binocular rivalry continued to be, as it had always been, the domain of experimental psychologists using psychophysical methods. This is no longer the case: the landscape changed dramatically with the neuroscience revolution of the 1980s. This era witnessed the emergence of new methods and techniques that offered novel ways to investigate the neural bases of rivalry and perceptual ambiguity. The neuroscience revolution ushered in a watershed period for the field of binocular rivalry, changing our knowledge base through techniques such as human brain imaging and multicell recordings in awake, behaving monkeys experiencing rivalry. This new approach had a large impact on the field, prompting a lot of good new science and a complete reevaluation of what constituted binocular rivalry. Now, a decade or so after these techniques were first used in rivalry, it is an opportune time to unite this body of knowledge in a single reference volume on binocular rivalry.

The eighteen chapters of this volume have been arranged in groups. Chapters 1 and 2 cover history, including the century of work in binocular rivalry since the pioneering monograph of Breese at the turn of the twentieth century. These chapters are well suited to the general reader and provide an ideal primer for the chapters that follow. Chapters 3 through 10 focus mainly on recent psychophysical investigations into binocular rivalry and other examples of ambiguous and bistable phenomena. Chapters 11 through 16 are all broadly concerned with the neurophysiology or neuroimaging of binocular rivalry and flash suppression, although several are complemented by psychophysical experiments. The book closes with two chapters that attempt to model the processes of binocular rivalry computationally, with one model based on nonlinear dynamics and the other a connectionist model whose dynamics arise from training.

Preceding the chapters is a foreword by Robert Fox, who was for several decades a key figure in the field of binocular rivalry beginning in the late 1960s. His foreword contains insights gleaned from his active participation in the field over the last thirty-five years and his knowledge of its evolution. The significance of his early studies in the United States is paralleled by the

contemporaneous work of Willem Levelt in The Netherlands. Although Levelt left the field of binocular rivalry for a career in psycholinguistics soon after his monograph on rivalry appeared in 1968, his work continues to influence contemporary researchers. His monograph is cited in the majority of chapters in this book, and his insightful “second proposition” (see chapters 8 and 18) has remained influential long after he left the field.

Finally, a few words of thanks are due. No volume can appear on the library shelves without a lot of help. We gratefully acknowledge the generous financial contribution to the binocular rivalry workshop made by three Vanderbilt University centers: the John F. Kennedy Center for Research on Human Development, the Vanderbilt Vision Research Center, and the Vanderbilt Institute for Public Policy Studies. We are also grateful to La Cassa di Risparmio di San Miniato (Savings Bank of San Miniato) who administer the sixteenth-century monastery formerly of the Cappucino monks and offer it freely as a study center. Special thanks are also due to Corinne Mesana-Alais, whose multilingual talents enabled two Anglophone researchers to organize a conference in the hills of central Italy. Most important, we are deeply indebted to the participants of the workshop who so willingly engaged in enthusiastic debate and in doing so contributed greatly to the vitality of this book.

REFERENCES

Lack, L. C. (1978). *Selective Attention in the Control of Binocular Rivalry*. The Hague, The Netherlands: Mouton.

Levelt, W. J. M. (1968). *On Binocular Rivalry*. Soesterberg, The Netherlands: Institute for Perception.