EVOLUTION OF LEARNING AND MEMORY MECHANISMS

Evolution of Learning and Memory Mechanisms is an exploration of laboratory and field research on the many ways that evolution has influenced learning and memory processes, such as associative learning, social learning, and spatial, working, and episodic memory systems. This volume features research by both outstanding early-career scientists as well as familiar luminaries in the field. Learning and memory in a broad range of animals are explored, including numerous species of invertebrates (insects, worms, sea hares), as well as fish, amphibians, birds, rodents, bears, and human and nonhuman primates. Contributors discuss how the behavioral, cognitive, and neural mechanisms underlying learning and memory have been influenced by evolutionary pressures. They also draw connections between learning and memory and the specific selective factors that shaped their evolution. *Evolution of Learning and Memory Mechanisms* should be a valuable resource for those working in the areas of experimental and comparative psychology, comparative cognition, brain–behavior evolution, and animal behavior.

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PREFACE

Volumes like this one often come about because scholars with a shared scientific interest agree that the time has come to synthesize the current status of their field of study. Here, that scientific interest centers on understanding how evolutionary processes influence the ways in which organisms learn and remember. Although a common theme is shared, the approaches taken are quite varied. Researchers examining Pavlovian conditioning in worms, cultural transmission of behavior in chimpanzees, and episodic memory in humans, for example, each pursue answers to questions of both *how* and *why* learning and memory processes have evolved, although their approaches to doing so are widely different. In addition, researchers of these topics may rarely interact, even though their subject matter shares a common theme. The purpose of this volume is to feature the diverse ways in which scientists have approached this topic, and, hopefully, in so doing provide readers with solid grounding on current methods and results from both laboratory and field experiments on learning and memory in animals, including humans.

We have been fortunate to assemble an amazing group of contributors to this volume. Each has discovered something fascinating about the evolution of learning and memory, and has something important to share. We are grateful that the authors of each chapter of this book agreed to collaborate on the effort, and we appreciate their hard work. When we proposed the project to Cambridge University Press, and as we began inviting authors to contribute, we received feedback that was music to our ears. People told us that this book was one of a kind, which naturally is exactly what we, and Cambridge University Press, wanted to hear. Our colleagues had positive remarks on the mixture of scientific backgrounds represented (e.g., within psychology and biology). The comment "I wish a book like this was available when I was starting out" certainly resonated with us, and we hope that a new generation of scientists-in-training will find inspiration in these pages.

Despite our early success in securing contributors to the book, the next steps in our path were not easy. Of course, one always expects challenges to major undertakings such as this. But at the outset we would have hardly expected a global pandemic to be among them. It is hard for us to sufficiently express our gratitude to the contributors to this volume. The coronavirus pandemic hit right in the middle of the project timeline. We all abruptly found ourselves in quarantine, worrying about our health and that of our loved ones, fighting to keep laboratories running, pivoting to online teaching, homeschooling children, protecting vulnerable friends and family members, and absorbing the pain and frustration of watching a large segment of the public refusing to acknowledge science. One of us (MK) lost his home and entire neighborhood to a wildfire in September 2020. We all watched helplessly, forced to the sidelines, as friends and colleagues contracted the virus; although many, thankfully, recovered, others did not.

So, it is with our utmost pleasure and pride that we have seen this project to completion. We sincerely thank Stephen Acerra and Emily Watton at Cambridge University Press for their editorial assistance and consultation throughout the course of this project; too often the rigor and feedback that go into creating an edited volume like this are overlooked. We are grateful to the anonymous reviewers of our proposal for their helpful comments and suggestions, as well as members of the Academic Press Board at Cambridge who decided that our proposal merited our efforts to make this book happen. Mark A. Krause thanks Gordon Burghardt (University of Tennessee–Knoxville) and Michael Domjan (University of Texas–Austin) for the wonderful years of collaboration and mentorship on the topics of learning, behavior, and evolution. Karen L. Hollis thanks Bruce Overmier (Professor Emeritus, University of Minnesota–Minneapolis) for more than 50 years of wise and caring mentorship, unshakable support, and deep and enduring friendship. Mauricio R. Papini thanks Jeff Bitterman (University of Hawaii–Manoa) and Bruce Overmier for their mentorship, guidance, support, and friendship.