Avian Cognition

The cognitive abilities of birds are remarkable: hummingbirds integrate spatial and temporal information about food sources, day-old chicks have a sense of numbers, parrots can make and use tools and ravens have sophisticated insights in social relationships. This volume describes the full range of avian cognitive abilities, the mechanisms behind such abilities and how they relate to the ecology of the species.

Synthesising the latest research in avian cognition, a range of experts in the field provide first-hand insights into experimental procedures, outcomes and theoretical advances, including a discussion of how the findings in birds relate to the cognitive abilities of other species, including humans. The authors cover a range of topics such as spatial cognition, social learning, tool use, perceptual categorization and concept learning, providing the broader context for students and researchers interested in the current state of avian cognition research, its key questions and appropriate experimental approaches.

Carel ten Cate is Professor of Animal Behaviour at Universiteit Leiden, the Netherlands. His research focuses on behavioural development and communication by vocal and visual signals in species ranging from birds and fish to humans. He also uses birds for comparative studies on the cognitive mechanisms relevant for speech and language processing in humans.

Susan D. Healy is a Reader in Zoology at the University of St Andrews, Scotland and Executive Editor of *Animal Behaviour*. Her work integrates theoretical and empirical data from the fields of biology and psychology to investigate the behavioural ecology and neurobiology of animal cognition, with a focus on birds.

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Preface

In the 1980s the emergence of behavioural ecology significantly changed the study of animal behaviour. It shifted the focus of many researchers from studying causal mechanisms to addressing the adaptive significance and costs and benefits of the way in which animals behaved. We are currently witnessing a similar shift in focus, one in which researchers are asking and addressing questions about the cognitive processes that underlie animal behaviour. This shift is visible in the rapidly expanding field of animal cognition where the focus is on analysing the nature and development of the 'knowledge' that enables animals to respond to the challenges they face in their daily life: going to the right place at the right moment, getting the food they need, dealing with conspecifics, and so on. These are intriguing questions and their answers not only tell us something about how animals 'think', but may also provide a window on the origin of our own thinking. Although primates, apes in particular, have long been the main group to which these questions have been addressed, more recently birds have emerged as the focus of attention. Birds show a diverse range of mental abilities, which are proving accessible to systematic research. Against this background, we organised an 'Avian Cognition' symposium at the International Ethological Congress in Newcastle, UK in 2013. It attracted a lot of interest and when we organised another one at the next meeting in Cairns, Australia in 2015, it was even more popular.

This volume arose out of the interest shown for these symposia. It became clear that many people would like to know more about the questions and progress of the field. It inspired us to invite colleagues working at the forefront of avian cognition to contribute to a book on the topic. We got enthusiastic responses, as well as stimulating support for the idea from Cambridge University Press, resulting in what has become this book. Right from the start we wanted it to be a book that would be of interest to those working in the field, reviewing the current state of knowledge, while at the same time being accessible for a broader audience consisting of interested researchers from other areas as well as suitable for (graduate) student seminars. We challenged our contributors to review relevant work beyond their own studies, to draw comparisons both among bird species as well as between birds and other species, including humans, and to keep their writing understandable. We thank all our authors for their great contributions (and for their patience with dealing with our comments). It has been a very rewarding exercise to collect all the wonderful work presented in this book. We hope it will be similarly rewarding to those reading it and that it will contribute to advancing the topic!

Carel ten Cate and Susan D. Healy
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