Human Reasoning and Cognitive Science

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Preface

In the late summer of 1998, the authors, a cognitive scientist and a logician, started talking about the relevance of modern mathematical logic to the study of human reasoning, and we have been talking ever since. This book is an interim report of that conversation. It argues that results such as those on the Wason selection task, purportedly showing the irrelevance of formal logic to actual human reasoning, have been widely misinterpreted, mainly because the picture of logic current in psychology and cognitive science is completely mistaken. We aim to give the reader a more accurate picture of mathematical logic and, in doing so, hope to show that logic, properly conceived, is still a very helpful tool in cognitive science. The main thrust of the book is therefore constructive. We give a number of examples in which logical theorizing helps in understanding and modeling observed behavior in reasoning tasks, deviations of that behavior in a psychiatric disorder (autism), and even the roots of that behavior in the evolution of the brain.

The manuscript was tried out by us in many courses over the past five years, and has been much improved as a result of the insightful questions of our students. Rineke Verbrugge and Bart Verheij also taught a course from a draft and we thank them and their students for much insightful feedback. We also thank the colleagues who commented on individual chapters or their precursors: Theodora Achourioti, Jonathan Adler, Marian Counihan, Richard Cox, Hartmut Fitz, Jim Greeno, Fritz Hamm, Wilfrid Hodges, Tikitu de Jager, Phil Johnson-Laird, Hans Kamp, Alex Korzec, Max Roberts, Lance Rips, Heleen Smid, and Martin Stokhof. Special thanks go to Bob Kowalski, who read and commented on the entire manuscript. The mistakes are, of course, our own.

We dedicate this book to our children.