

Preface

Our decision to organize this book was not based, as it might seem, on a suddenly emerging feeling that such a book was needed. Instead, it was a rather natural consequence of a series of events that began some ten years ago, at the very beginning of the twenty-first century. The following is a chronology of these events.

In early 2000, it was pointed out to us (at a discussion following a seminar on the fuzzification of formal concept analysis at Binghamton University) that fuzzy logic had apparently been found useless within the field of the psychology of concepts and had been totally abandoned. This casual information stimulated our curiosity. We knew that fuzzy logic was well developed at that time and its usefulness established in many areas of human affairs. We were wondering what the arguments were for its rejection in the psychology of concepts.

After searching through the relevant literature in the psychology of concepts, we found that the arguments had been advanced in a single paper published in 1981. By examining these arguments in detail, we found, to our surprise, that all were fallacious. We also discovered that, by and large, they had been accepted uncritically as valid within the literature on concepts. The very nature of science required that these discovered errors be corrected. We decided, together with two of our colleagues at Binghamton University (Harold Lewis and Eileen Way), to write two articles on these disturbing discoveries.

In our first article, which was published in 2002, we focused solely on analyzing in detail the various erroneous claims. In the second paper, our aim was to describe how these claims adversely influenced attitudes toward fuzzy logic in the psychology of concepts. Writing this paper took much

longer since it required us to delve deeper into the literature on concepts. The article was eventually published in 2009.

Two reviews we received for our second article were very thorough and positive. Both reviewers considered it very important that we exposed the errors and showed how they had led to the virtual renouncement of fuzzy logic in the psychology of concepts. However, they argued that this alone would not likely change the unfavorable situation. Therefore, they both recommended to us, in slightly different ways, to go one step further and demonstrate that fuzzy logic is actually a useful mathematical tool for dealing with some problems in the psychology of concepts. This recommendation created an interesting dilemma for us. On one hand, we wholeheartedly agreed with it. On the other hand, we realized that it was beyond our capabilities. We felt that cooperation between psychologists of concepts and mathematicians working in the area of fuzzy logic was requisite for accomplishing the recommended additional step. After considering how to stimulate such cooperation, the idea of organizing this book emerged as the winner.

We thus consider the primary purpose of this book to stimulate cooperation between psychologists of concepts and mathematicians working in the area of fuzzy logic. We are fortunate that the MIT Press, one of the leading publishers in the psychology of concepts, expressed a strong interest in publishing the book. We are also fortunate that our contributors are outstanding psychologists who are genuinely interested in supporting the purpose of this book.

The material for this book was carefully selected with the intent to stimulate cooperation between the two communities of researchers. Invited contributors were asked to write chapters on specific topics pertaining to the purpose of the book. Once the writing of all chapters had been completed, efforts were made to eliminate duplications between chapters and, more importantly, to achieve consistency and completeness of the covered material with respect to the purpose of the book. The work on the book has been, at least to some degree, a team effort of the editors and invited contributors alike.

The primary audience for this book consists of researchers in the two academic communities we directly address—psychologists of concepts and mathematicians pursuing research on fuzzy logic. The secondary audience

is likely to be quite broad and may include researchers in linguistics, cognitive science, artificial intelligence, and history and philosophy of science. This book may also be useful as supplementary reading in graduate courses in any of these areas.

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