

McGraw-Hill Paperbacks

# MIND OVER MATH

Put yourself on the  
road to success  
by freeing yourself  
from math anxiety

**DR. STANLEY KOGELMAN**  
**DR. JOSEPH WARRI**

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**MIND OVER**

# **MATH**

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**and**  
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**McGraw-Hill**

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*To  
Elaine Sorel  
for her warmth, friendship,  
and inspiration*

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# **preface**

Although we are both mathematicians, we came to understand people's fear and dislike of mathematics in different ways. After several years of doing mathematical research and teaching in college, Stan found his interests changing and moving toward psychology. He decided to enter a master's program in clinical social work at Smith College where he discovered that his fellow students had no difficulty with any of the psychology courses but dreaded the required statistics course.

The intensity of their feelings was striking and Stan began to wonder if math difficulties might have emotional roots. He researched the causes of math anxiety in his thesis, which was completed in the summer of 1975.

In early 1976, at an open house at Wesleyan University in Middletown, Connecticut, Stan met Joseph Warren. A math clinic had just been established at Wesleyan with the support of a federal grant under the leadership of Ms. Sheila Tobias, Associate Provost of Wesleyan, and Professor Robert Rosenbaum, a mathematician. Stan later became a consultant to the math clinic.

Joe's interest in math anxiety developed from his experience in teaching and working with people individually. He had ob-

served that, for many, no amount of patient tutoring enabled them to learn math. He had personally experienced difficulty with math in the early grades at times of stress that had nothing to do with math. He realized math problems could be more emotional than intellectual.

In the spring of 1975, Joe started a program for individuals called "Math Therapy." He found that people were able to learn more math more quickly if they discussed their feelings about the subject with him.

We both realized there was a general public need for programs to help larger groups of people overcome math anxiety. We decided to start such a program in New York City and felt a group approach would be most effective. Ms. Tobias introduced us to Elaine Sorel, who had a background of working with artists, writers, and directors. She specialized in developing, presenting, and promoting new ideas.

Together, the three of us (Elaine, Stan, and Joe) developed "Mind Over Math," which was founded by Stan and Joe in June, 1976 as a consulting service offering programs aimed at reducing math anxiety for schools, colleges, corporations, and groups of individuals.

This book is based primarily on our experience in leading groups to help people overcome math anxiety. Chapter One is based, in part, on Stan's research on the causes of math anxiety. The initial writing was a joint project, the final writing being done by Stan.

The inspiration for this book came from Elaine Sorel, who has extraordinary vision and intuition. Her creativity, support, insight, and enthusiasm has furthered the growth and the development of Mind Over Math.

Our warm thanks go to all those who have so openly shared

## PREFACE

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their feelings and experiences about math.

We are indebted to Mimi Clifford, Noreen Goldman, and Maryann MacBride for their caring support and invaluable suggestions throughout the course of this work. Stan especially wants to thank his daughter Laura for her patience, love, and understanding.

Stanley Kogelman  
Joseph Warren  
*March, 1978*



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# introduction

Many people react to math so strongly that their ability to memorize, concentrate, and pay attention is effectively inhibited. This makes learning impossible. It also makes testing math ability impossible, because often all that can be assessed is the test-taker's math anxiety.

We cannot believe that someone who performs well in other disciplines would have no ability in math. This is not to say that each person should be able to perform equally well in all areas. But we do feel that the difference in ability should not be as wide as it often is.

We found that math anxiety can be overcome and performance improved by participation in a series of five weekly Mind Over Math workshops focused on approaching math rather than on solving problems.

The atmosphere of the workshops suggests a living room more than a classroom. There is no blackboard, and there are no tests and no homework. Coffee is always ready, and cookies, cheese, and crackers are laid out. In the first session, a group of ten people sit in a circle and recall their experiences with math: specific teachers; early difficulties; present feelings.

Like the Mind Over Math workshops, this book will help overcome math anxiety gradually. The first five parts follow the themes of the workshops. Each successive chapter lays the groundwork for decreasing anxiety. Material that might be anxiety provoking if looked at immediately will be less upsetting later on. It is important, therefore, to read the book in sequence. At times readers may feel like skipping certain parts. We urge them to resist this temptation.

In Part One, as in the first workshop session, no math is discussed. The focus is on the nature, causes, and effects of the math anxiety experienced by so many people.

Part Two, "Math Dynamics," will give readers deeper insight into their interactions with math. This insight will make it possible to *break the cycle in which anxiety controls people's approaches to math.*

Part Three, "Mind Over Math," reveals that doing math is not much different from doing anything else. *The same skills that bring success in other areas of life can be utilized in learning and doing math.*

Part Four, "Doing Math," offers practice and reinforcement, as well as practical suggestions.

Part Five, "After Math," describes how the techniques used to overcome math anxiety can be carried over to other things that people feel they "just can't do." It is an interesting fact that, in the course of reducing math anxiety, people find they can suddenly do seemingly unrelated things like change fuses, use a reflex camera, follow instructions, read legal documents, and even play tennis. The removal of an apparent deficiency in thinking leads to improved self-confidence and self-image. These changes in attitude show up in

increased assertiveness in both daily and job-related activities.

Part Six, "Supplemental Math," provides an overview of math topics for further study, after the fear of math has been overcome.

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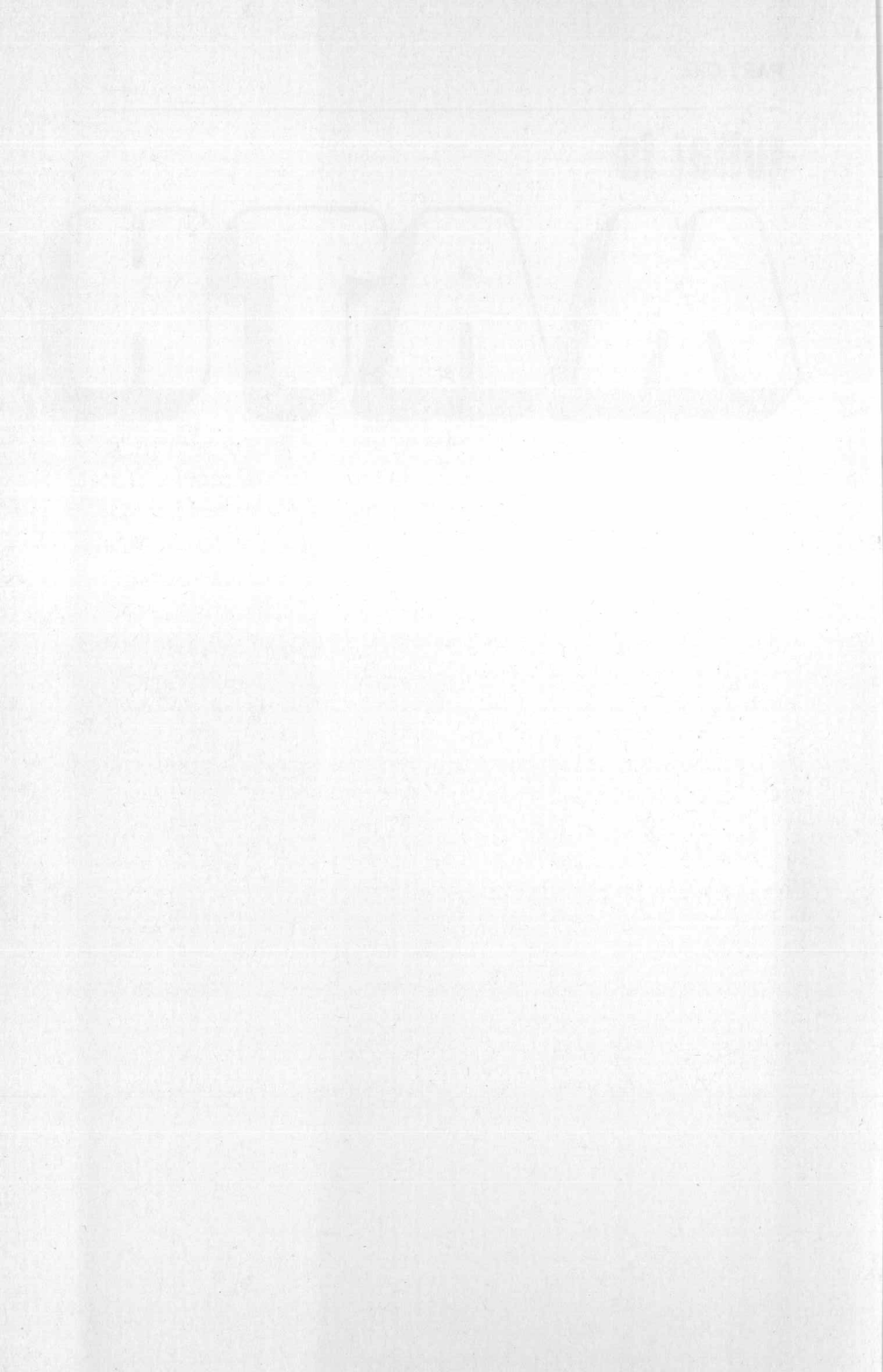
PART ONE

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what is

**MATH?**





# what is math anxiety?

After looking forward to it all week, we had finally arrived at Karen's party. There were just the right number of people. Her parties were always relaxed and fun and we knew we'd make new and interesting acquaintances since so many of her friends were artists, writers, actors, producers, and executives. Music was playing, but not too loudly, and the food looked fantastic.

We told Karen we wanted to meet Betty and Susan, two successful business executives. Karen felt sure they'd be interested in meeting us. But when she introduced us to them by saying we were mathematicians, they instantly turned off. "Why didn't you tell me that there were going to be mathematicians here?" Susan said accusingly to Karen. They looked us up and down and visibly began to withdraw. Within a few moments they had excused themselves to get some drinks. We saw little of them for the rest of the evening.

It is disappointing when people we are attracted to avoid us just because we are mathematicians. All the mathematicians we know have similar experiences with most people they meet. Joan, a workshop student of ours, explained that she would never expect to be able to talk to a mathematician about anything. "They are a different species, it would be like talking to