## TABLE OF CONTENTS

PREFACE	1X
ACKNOWLEDGMENTS	xiii
PART I: THE THEORY	
CHAPTER 1 / Intuition and the Need for Certitude	3
The Complexity of the Domain	3
The Need for Certitude	7
A Preliminary Definition	13
CHAPTER 2 / Intuition and Mathematical Reasoning	15
The Real World and the Mathematical World	15
The Behavioral Meaning of Mathematical Concepts	19
Axiomatic Structures and Intuitive Procedures	22
Intuitive Concepts and the Scientific Community	24
CHAPTER 3 / Investigations in Overconfidence	28
Overconfidence and Intuitive Biases	28
Educational Implications: Overconfidence and Metacognition	36
Summary	41
CHAPTER 4 / General Characteristics of Intuitive Cognitions	43
Self-Evidence	43
Intrinsic Certainty	45
Perseverance	47
Coerciveness	47
Theory Status	50
Extrapolativeness	50
Globality	53
Implicitness	54
Summary	56
CHAPTER 5 / The Classification of Intuitions	57
Piaget's Classification	57
Classifications of Intuitions Based on Roles and Origins	58
Summary	70
CHAPTER 6 / Inferential Intuitions and Logical Reasoning	72

## PART II: FACTORS WHICH SHAPE INTUITIONS

CHAPTER 7 / Intuition and Experience The Behavioral Roots of Intuitive Representations	85
Experience and Intuitive Biases	85 89
Summary	95
CHAPTER 8 / The Practicality of Intuitive Meanings. Analysis of an	75
Example: The Negative Numbers	97
CHAPTER 9 / Factors of Immediacy	103
Visualization	103
Availability	106
Anchoring	107
Representativeness	108
Summary	109
CHAPTER 10 / Factors of Globality	111
Summary	120
CHAPTER 11 / Intuition and Intuitive Models	101
Classification of Model Types	121 121
Role of Tacit Intuitive Models	121
Summary	125
CHAPTER 12 / Models and Analogies	
The Role of Analogy in Model Construction	127
Analogic Models in Mathematics	127
Analogies as Sources of Misconceptions in Mathematics	129
Summary	136 142
CHAPTER 13 / Paradigmatic Models	142
-	
CHAPTER 14 / Diagrammatic Models	154
Summary	165
CHAPTER 15 / Phenomenological Primitives	167
CHAPTER 16 / Conflicts and Compromises	176
Impetus versus Inertia	176
Striving for Cognitive Compromise	181
Impact of the Impetus Model: Further Experimental Evidence	184
Conciliatory Models	187
Summary	191
CHAPTER 17 / Factors of Perseverance and Closure: The Primacy	
Effect	193
Summary and Comments	198

TABLE OF CONTENTS	vii
CHAPTER 18 / Summary and Didactical Implications	200
The Role of Intuition: A Summary	200
The Classification of Intuitions	201
Intuitions and Models	202
The Mechanisms of Intuitions	204
Conflicts and Compromises	205
Didactical Implications	206
Concluding Remarks	211
BIBLIOGRAPHY	215
INDEX OF NAMES	223