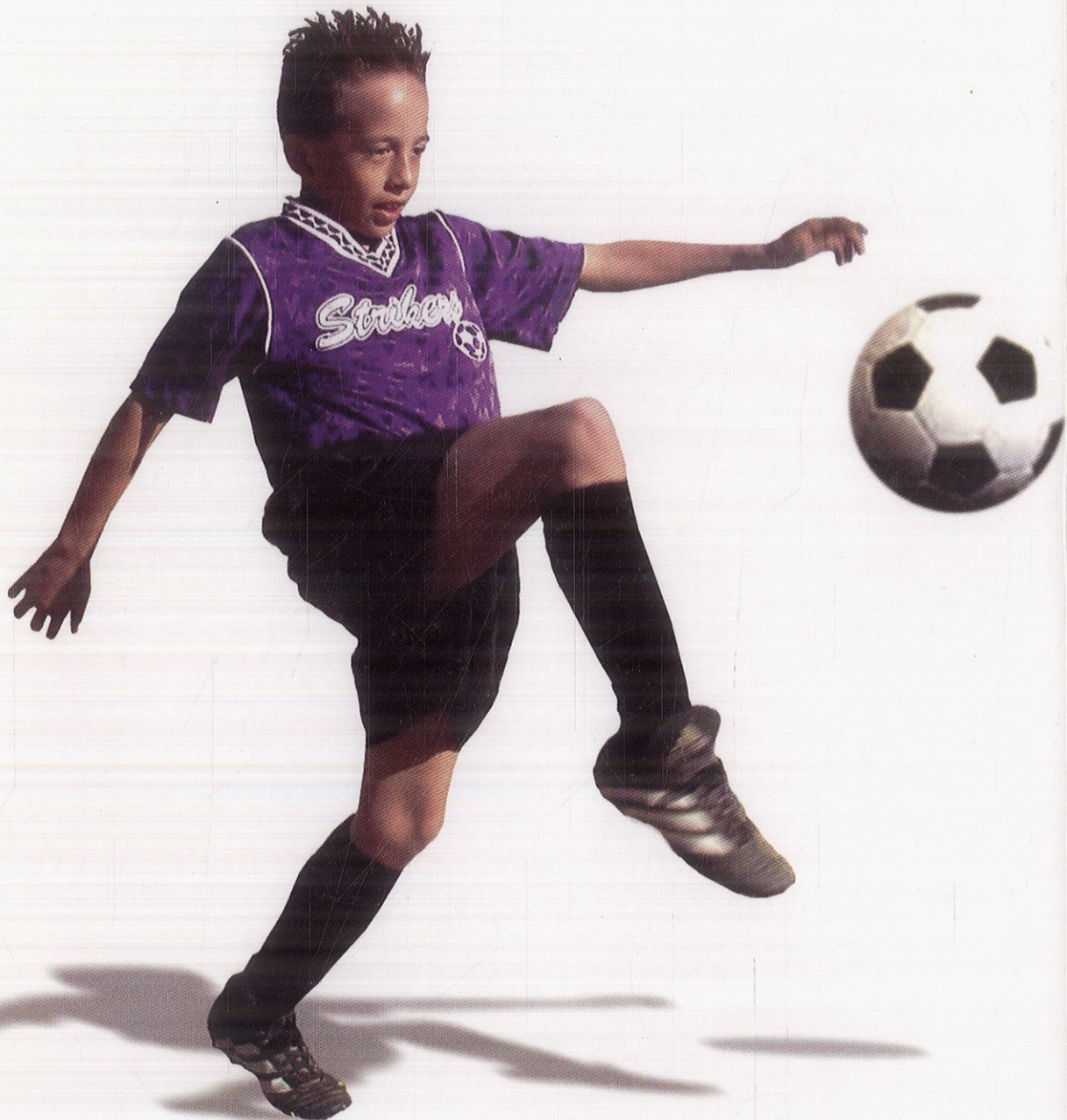


MOTOR LEARNING AND CONTROL FOR PRACTITIONERS



Cheryl A. Coker

CONTENTS

PREFACE XIII

ACKNOWLEDGEMENTS XIX

PRETEST XXI

CHAPTER 1

Introduction to Motor Learning and Control 1

Motor Learning, Control and Performance 3

What Is Learning? 3

The Nature of Motor Skills 4

Skill Classifications 5

Individual Differences 12

Motor Abilities 12

Categorizing Motor Abilities 13

Practical Implications 15

A Look Ahead 18

Summary 18

Review Questions 19

References 20

CHAPTER 2

Understanding Movement Preparation 21

Theoretical Approaches to Movement Preparation 22

Preparing a Response 25

Factors Influencing Reaction Time 25

Reducing Response Time: Beyond Movement Preparation 33

Attention 34

Theoretical Models of Attention 35

Tips for Practitioners 36

Selective Attention 37

Attentional Focus 38

Arousal 39

Arousal and Movement Preparation	40
A Look Ahead	42
Summary	42
Review Questions	43
References	44

CHAPTER 3**Behavioral Theories of Motor Control 47**

Coordination and Control	48
Skilled Movement: Central Command Center or <i>Dynamic Interaction?</i>	48
Motor Programs	49
The Generalized Motor Program	49
Specifying Parameter Values: The Schema	52
Executing the Program	55
Evidence Supporting Motor Program Control	57
Generalized Motor Program Synopsis	59
Dynamic System Theory	59
Constraints	60
Self-Organization	62
Attractor States	64
<i>Evidence Supporting Dynamic System Control</i>	66
Dynamic System Theory Synopsis	67
A Look Ahead	67
Summary	68
Review Questions	68
References	69

CHAPTER 4**Neural Mechanisms: Contributions and Control 71**

Nervous System	72
Sensory Receptors	72
Vision	72
Proprioception	78
Transmission of Information	82
The Spinal Cord	82
The Brain	86
Cerebrum	86
Cerebellum	89
Memory	90
A Look Ahead	92
Summary	93

Review Questions 94

References 94

CHAPTER 5

Stages of Learning 97

Stages of Learning 98

Fitts and Posner's Three Stage Model 98

Gentile's Two-Stage Model 101

Inferring Progress: Learner and Performance Changes 103

Movement Production 103

Attention 107

Error Detection and Correction 109

Self-Confidence 109

Measuring Progress 110

Performance Curves 110

Performance Plateaus 112

Retention Tests 113

Transfer Tests 113

A Look Ahead 114

Summary 114

Review Questions 114

References 115

CHAPTER 6

The Learner: Pre-Instruction Considerations 117

Learning Styles 118

Perceptual Mode 121

Accommodating Your Learners 121

Transfer of Learning 123

Types of Transfer 124

Theories of Transfer 124

Transfer and Instructional Design 125

Fostering Positive Transfer 126

Motivation to Learn 131

A Look Ahead 132

Summary 132

Review Questions 133

References 133

CHAPTER 7

Skill Presentation 136

Learner Preparation 137

Verbal Instructions 137

Role of Task Instructions	139
Amount of Information	140
Precision	140
Locus of Attention: Initial Instructions	140
Locus of Attention: Skill Refinement	141
Frame of Reference	143
Learning Styles	143
Previously Learned Skills	143
Verbal Cues	143
Check for Understanding	144
<i>Demonstrations</i>	145
Theories of Observational Learning	145
Designing Effective Demonstrations	145
Discovery Learning	154
Guided Discovery	155
<i>A Look Ahead</i>	155
Summary	155
Review Questions	156
References	157

CHAPTER 8**Practice Design Factors 159**

Breaking Down Skills: Progressions and Sequencing	160
Whole vs. Part Practice	160
Speed-accuracy Tradeoff	166
Bilateral Transfer	169
Psychological Strategies	170
Motivation and Practice	171
Goal Setting	171
Mental Practice	173
<i>A Look Ahead</i>	176
Summary	177
Review Questions	177
Reference	178

CHAPTER 9**Practice Schedules 181**

Practice Context	182
Variable Practice	182
Contextual Interference	185
Practice Distribution	190
Massed vs. Distributed Practice	190

Maximizing Time on Task 192
 Rest Intervals 192
 Equipment Substitutions 192
 Drill Design 194
 A Look Ahead 194
 Summary 194
 Review Questions 195
 References 196

CHAPTER 10

Diagnosing Errors 199

Skill Analysis 199
 Conducting an Observation 200
 Determining the Cause of an Error and its Resolution 203
 Errors Due to Constraints 203
 Comprehension Errors 205
 Errors in Selection 206
 Execution Errors 208
 Sensory Errors 210
 Should the Error Be Corrected? 211
 A Look Ahead 212
 Summary 212
 Review Questions 213
 References 213

CHAPTER 11

Correcting Errors 215

Types of Feedback 215
 Functions of Augmented Feedback 218
 Sources of Augmented Feedback 219
 Auditory Feedback 219
 Visual Displays 219
 Equipment and Drills 221
 Biofeedback 222
 Content of Augmented Feedback 223
 Error vs. Correct Feedback 223
 Descriptive vs. Prescriptive Feedback 224
 Precision of Augmented Feedback 224
 Augmented Feedback Frequency 225
 The Guidance Hypothesis 225
 Timing of Augmented Feedback 227

Contents

Feedback-Delay Interval 228

Post-Feedback Interval 229

A Look Ahead 230

Summary 230

Review Questions 231

References 231

EPILOGUE - TEST YOUR KNOWLEDGE 234

GLOSSARY 241

NAME INDEX I-1

SUBJECT INDEX I-7