A Multilevel Approach to the Study of Motor Control and Learning

Second Edition

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The second edition of a Multilevel Approach to Motor Control and Learning expands upon the goal of the first edition: to provide a textbook for upper division undergraduate and entry-level graduate students in kinesiology that addresses motor control and motor learning concepts in the same text. What continues to differentiate this text from others that address one or both of these important subject areas is its multilevel approach. The content contained in this text is not only presented at a behavioral level of analysis but at a neurological level of analysis also. The significantly expanded content at both levels of analysis in the second edition will be particularly appropriate for students interested in pursuing postgraduate studies in health care professions such as physical therapy and/or professional careers in rehabilitation settings.

The book continues to be divided into two sections: Motor Control and Motor Learning. The first section—Chapters 1 through 5—presents an in-depth discussion of the prominent motor control theories and the scientific evidence in support of each theory and/or theoretical perspective. The underlying mechanisms that contribute to motor control are explored at both a behavioral and neurological level of analysis. At the completion of this section, the reader should have acquired a strong understanding of the behavioral and neurological processes that are involved in the planning and executing of many different movement skills.

The second section—Chapters 6 through 12—focuses on the theoretical concepts that underlie the acquisition, retention, and, in some cases, forgetting of learned movement skills. The multilevel theoretical approach is followed in this section also, as the behavioral changes associated with the learning of movement skills are once again linked to the underlying neurological mechanisms. This section of the book also emphasizes practical application as issues related to how motor skills should be introduced and practiced for optimal retention and transfer are discussed.

New to This Edition

1. A coauthor. It is a privilege and honor to be writing this second edition with my mentor, Dr. Robert Christina. Dr. Christina brings a wealth of knowledge and history of the field of motor control and learning that adds a richness and depth to the content presented in a number of chapters, but most notably the motor learning section of the book.

2. A new chapter that addresses the issue of the transfer of learning.

3. Major restructuring and reordering of chapters. The reordering of chapters provides a more cohesive discussion of the subject matter and was based on reviewer feedback and our own critical review of the first edition.

4. Expanded and updated content in all chapters. There is a more comprehensive discussion of the major theoretical approaches that have guided the research conducted in the areas of motor control and learning.
5. Addition of practical activities at the end of selected chapters. These provide the instructor with opportunities to engage the students in classroom activities that add a practical dimension to the theoretical content presented in the book.

6. Addition of more highlight boxes. Each addresses an important theoretical concept or controversy, a classic experiment, or examples of how motor control and learning theory has been applied to practice.

**Pedagogical Features**

The pedagogical features in the second edition have been expanded to include practical activities at the end of selected chapters, additional summary boxes that emphasize important points presented in the text, and new highlights in every chapter that address pivotal research findings from sport and clinical settings, important theoretical concepts, or practical applications of research.

**Acknowledgements**

This second edition would not have come to fruition without the significant contributions and support of my coauthor, Bob Christina, and the encouragement of so many of my colleagues in motor control and learning who adopted the first edition of this textbook over six years ago and kept asking when the second edition was going to be published. Of course, our book editors at Benjamin-Cummings kept asking us the same question, as we missed our submission deadlines on multiple occasions. Fortunately for us, Christina Pierson and Deirdre Espinoza both recognized that writing a textbook, even a second edition, is a serious undertaking and one that cannot be rushed if it is to be a product of which everyone can be proud. I would also personally like to thank my faculty colleagues in motor control and learning at Cal State-Fullerton, David Chen and Michelle Barr, who provided me with excellent feedback on the first edition based on their own personal teaching experiences using the book. Finally, I wish to thank each and every undergraduate and graduate student who I have taught in the six years since this book was first published. They have been my very best critics as the target audience for whom this book is intended. I hope that this second edition addresses many of their criticisms of the first edition.

**Reviewers**

Laurie Lundy-Ekman, Pacific University; Jeffrey M. Haddad, University of Massachusetts–Amherst; Rachel D. Seidler, University of Michigan; Amy Haufler, University of Maryland; Shane Frehlich, California State University–Northridge; Richard Stratton, Virginia Tech; Steven J. Radlo, Western Illinois University; Ann Gentile, Teachers College, Columbia University; Daniel Corcos, University of Illinois at Chicago; Qin Lai, Wayne State University; Lori Ploutz-Snyder, Syracuse University; Gabriele Wulf, University of Nevada–Las Vegas.
What is multilevel approach to the study of motor learning and control? A behavior level analysis-adopting information-processing approach. The environment is important factor in considering movement. Scientific measurements of motor performance and learning, changes in perception and cognition changes in performance. Measuring learning-related changes in perception and cognition Motor Learning and Performance: A Situation-Based Learning Approach, Fourth Edition, outlines the principles of motor skill learning, develops a conceptual model of human performance, and shows students how to apply the concepts of motor learning and performance to a variety of real-world settings. Information Processing in Motor Control and Learning provides the theoretical ideas and experimental findings in the field of motor behavior research. The text presents a balanced combination of theory and empirical data. Chapters discuss several theoretical issues surrounding skill acquisition; motor programming; and the nature and significance of preparation, rapid movement sequences, attentional demands, and sensorimotor integration in voluntary movements.