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Acknowledgments

One reason this book exists is that a number of colleagues and students urged me to write it. I thank them for their encouragement but refrain from naming all of them here because, honestly, I don’t know who all of them are. Often at conferences, young investigators who had read the first edition of Human Motor Control asked me when I would be coming out with a second edition. I confessed that I didn’t know if I would be preparing a second edition, let alone when I would do so, but I appreciated their inquiries and felt encouraged by them.

Bruce Roberts, then at Elsevier, the parent company of Academic Press, contacted me in August 2006 and invited me to consider a second edition of Human Motor Control. I’m not sure what triggered Bruce’s invitation 15 years after the first edition’s release, but his email was welcome and reassuring. I hadn’t embarked on a second edition because I was so busy with my lab research, with my responsibilities as Editor of Journal of Experimental Psychology: Human Perception and Performance for the 2000–2005 volumes, and with the other textbook I wrote in the interim, MATLAB for Behavioral Scientists (Rosenbaum, 2007). With the editing and other textbook out of the way, I felt more open to embarking on a second edition of this book. Nikki Levy helped seal the deal with Elsevier. I appreciate her patient counsel as I struggled with the decision about whether to undertake a major project like this. I also thank the people associated with Elsevier who helped with aspects of the book’s production: Joanna Dinsmore, Jerome Devaraj Gnanasekar, Paul Gotttehrer, and Barbara Makinster.

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The first edition of Human Motor Control was dedicated to my wife, Judith F. Kroll. My dedication to Judy has only deepened over the years, so I re-dedicate this second edition to her. Around the time of this writing, Judy and I celebrated our 33rd wedding anniversary, a marriage made all the more blessed by our wonderful daughters, Nora and Sarah Kroll-Rosenbaum, both of whom are successful not only in their careers (music and law, respectively), but also, and more importantly, in the way they treat others, being generous, loving people. I dedicate this book to all three of these special women in my life.
Think of all the things you did to look at this page. If you are in a bookshop, you had to enter the shop, walk down the aisles, locate the section of the bookstore that had this volume, find this book on the shelf, reach for it without yanking off other volumes, open the book, use your fingers to get to this page, and use your eyes to get to this point. For all these activities to occur, you had to draw on your knowledge of the world to make decisions about what to do, and you had to use your brain, muscles, and limbs to carry out the movements needed to bring you to your present position. How all these events came together is the subject of this book. So too are the things that make it possible to do other everyday tasks such as opening soda cans, writing notes, and singing love songs.

Motor control underlies all the activities we engage in: breathing, remaining upright if we wish, walking, reaching for objects, talking, and text messaging, to name a few. We have a vested interest in understanding how we control the motion and stability of our bodies. Many of the technologies we use and the skills we develop are embodied in the capacity to move or hold still. If we can understand how human motor control works, we can design safer workplaces, better tools, smarter robots, and more effective methods for teaching skills to others. Also, we can rehabilitate, cure, or possibly even prevent motorically expressed medical disorders.

The fact that this is the second edition of Human Motor Control means that the first edition was successful enough to warrant a second airing but not complete enough to stand on its own forever. The first edition was indeed successful, or at least as successful as a book on this topic can be. One reason for its success was that it conveyed the fun, excitement, and challenges of the many approaches that contribute to the field of human motor control. The second edition is meant to do the same. The many advances in the field call for an update.

As was true of the first edition of Human Motor Control, the second edition focuses on four core problems that lie at the heart of the field:

1. How are movements selected to achieve particular tasks when, as is almost always the case, infinitely many movements will achieve them (the degrees of freedom problem)?
2. How are behaviors sequenced in time (the sequencing and timing problem)?
3. How are perception and motor control combined (the perceptual-motor integration problem)?
4. How are perceptual-motor skills acquired (the learning problem)?

Throughout this book, these four problems will be at the heart of all that is discussed. The organization of the second edition is similar to the organization of the book in its first incarnation. Part I, Preliminaries, sets the stage for the problems and approaches to
be followed. Part II, *The Activity Systems*, focuses on the major functional systems that we
depend on: Walking, Speaking, Smiling, and so on. The last part of the book, Part III, *Future
Directions*, looks to new, exciting avenues of study, including new forms of therapy, the crea-
tion of closer ties between motor control and psychiatry, advances in genetics, new theoretical
advances, and new methods for this area of study.

A great many advances have been made since the first edition appeared. Some of them
are worth signaling in advance:

1. Schizophrenia and other psychiatric problems may be rooted in malfunctions of basic perceptual-motor circuits.
2. When physical actions are prepared, there is priming for the perceptual consequences that follow. This explains why, among other things, we can’t tickle ourselves.
3. Our ability to understand what others say or do relies on internal modeling of the others’ intentional state.
4. Robots can perform much more adroitly and with much less energy consumption than was true in the 1980’s and early 1990’s.
5. Advances in computational models of motor control have enabled simulated actors—sometimes called *avatars* or *simulacra*—to perform in ways that are much more like human performance than was possible before.
6. Neuroscientists have opened the “black box” of the brain, and have shed new light on neural circuits underlying action, attention, perception, and learning. Such advances have been made possible through a variety of methods that were only beginning to be developed in the early 1990’s, most notably, functional magnetic resonance imaging (fMRI) and transmagnetic stimulation (TMS).
7. Major advances have been made in genetics, and these have provided new insights into the genetic bases of many motorically expressed abilities and disabilities.

Along with these developments have been others, too numerous to mention in this Preface. Suffice it to say, they will be presented in the text.

A minor change in the format of the second edition is to consolidate all the reference lists in one grand end-of-book References section. This avoids redundancy and highlights the fact that though the various topics in this book can be considered separately, all of them, ultimately, belong together.

Writing a second edition of a book affords an author the chance to atone for sins of com-
mission and omission. The first edition had errors of both kinds. All the errors of which the
author is aware have been rectified and new errors are, hopefully, few in number.

Besides these major additions, new material has been added throughout this volume and some old material that seems less critical has been removed. Of necessity, a book like this must be selective in what it includes. A number of new findings are not presented here just because of the way the story unfolded.