

Contents

Prologue. The Contributions of Lawrence D. Shriberg: A Life's Work <i>Rhea Paul and Peter Flipsen, Jr.</i>	vii
Contributors	x
1. Childhood Speech Sound Disorders: From Postbehaviorism to the Postgenomic Era <i>Lawrence D. Shriberg</i>	1
2. Explaining Developmental Communication Disorders <i>J. Bruce Tomblin and Morten H. Christiansen</i>	35
3. Genetic Influences on Speech Sound Disorders <i>Barbara A. Lewis</i>	51
4. Subgroups, Comorbidity, and Treatment Implications <i>Ann A. Tyler</i>	71
5. Children's Speech Sound Disorders: An Acoustic Perspective <i>Raymond D. Kent, Luciana Pagan-Neves, Katherine C. Hustad, and Haydee Fiszbein Wertzner</i>	93
6. Computer Processing for Analysis of Speech Disorders <i>John-Paul Hosom</i>	115
7. Motor Speech Disorders in Children with Autism <i>Shelley L. Velleman, Mary V. Andrianopoulos, Marcil J. Boucher, Jennifer J. Perkins, Keren E. Averbach, Alyssa R. Currier, Michael J. Marsello, Courtney E. Lippe, and Richard Van Emmerik</i>	141
8. Vocal Production in Toddlers with Autism Spectrum Disorders <i>Elizabeth Schoen, Rhea Paul, and Katarzyna Chawarska</i>	181
9. Understanding Speech-Sound Change in Young Children Following Severe Traumatic Brain Injury <i>Thomas F. Campbell, Christine A. Dollaghan, and Janine E. Janosky</i>	205
10. Factors Associated with the Intelligibility of Conversational Speech Produced by Children with Cochlear Implants <i>Peter Flipsen, Jr.</i>	225
Index	247

Prologue

The Contributions of Lawrence D. Shriberg: A Life's Work

Larry Shriberg was our teacher when we were graduate students at the University of Wisconsin-Madison, although we were there nearly 20 years apart. At a time in the history of the field of communication disorders when many were abandoning their traditional role as “speech therapists” and moving toward more trendy topics in language development and disorders, Larry was a bastion of continued commitment to the long-standing core of our profession, concerning the acquisition of the ability to produce the speech of one’s community, and the ways in which that process goes awry. When everyone else was teaching clinicians to use child-centered, facilitative play techniques, Larry continued to teach behavioral methods. Larry’s stance should not, however, be seen as that of a contrarian. His commitment to evidence-based approaches meant that he believed the data should be examined as carefully as possible before moving from methods that have empirical support to those that just sound sexier. Larry was one of very few investigators who actually studied the effects of various forms of treatment, as well as the effects of clinician’s style of presentation. He was also interested from very early in his career in the ways in which psychosocial variables, such as birth order, influenced the acquisition of speech sounds.

What Larry has brought to the study of speech, apart from a deep fascination with

every factor that composed and influenced it, has been a profound commitment to data and detail. His research has demonstrated the highest level of attention to multiple sources of information and the value of digging deep within each source for the fullest understanding it could reveal. Larry has long advocated, for example, allophonic level coding of speech production from children, in the belief that only by looking at subtle variations in production could we learn about their source. He has also long believed that it was worth the time and effort it took clinicians to learn these skills because they were critically important in understanding their clients. But he has always searched for ways to make these efforts “doable” in the real world. In the early 1970s, before the wide availability of hand-held calculators, Larry created tables that he distributed to clinicians for converting numbers to percentages. That way, clinicians could easily look up percentages of correct production based on data taken from clinical samples without having to do any long division. Later, he created the PEPPER computer program, and linked it up to the popular SALT program, to help clinicians do phonological analyses more efficiently and to integrate them with language data. In all these efforts, Larry has demonstrated his unwavering commitment to the clinical application of research and his belief that there is no disconnect between the laboratory and clinic.

One of Larry's most enduring contributions to the study of speech has been the development of a principled, data-based approach to classification. His scheme for categorizing disorders of speech sound development, published first over 20 years ago, remains without serious competition. In recent years, Larry has been in the forefront of research on the genetic basis of speech disorders. The path to this endeavor was paved by his interest in classification, and his approach to this study has been no less impressive than his efforts in the earlier stages of his career. He believes that the key to genetic research is the delineation of the most precise phenotype that will allow the linkage of discrete behaviors to specific genes and that the only way to accomplish this is to describe phenomena that may look unitary on the surface, such as developmental speech disorders, at the level of detail that will allow not only subclassification schemes, but the isolation of markers that could lead to genetic linkage. In this endeavor, Larry has been unique in both his productivity and originality.

Aside from the quality and quantity of Larry's contribution to our profession, which are both remarkable and with few peers, what motivated us to create this tribute was his effect on not only our careers, which is inestimable, but on our lives. Larry is the staunchest of mentors and the truest of friends. For both of us, Larry has been a career-long guide and presence. Although he may not always be unreservedly positive about everything we do, we always grew—however painfully—as a result of our interactions with him. We each remember meetings when, after reviewing a contribution to a paper we were writing together, Larry looked at us and said, "This just isn't good enough." After we got over the feeling of devastation and embarrassment, we realized he was right, went back to work, and tried

harder. In every case, we turned out better products as a result. It wasn't always easy or comfortable with Larry, but we knew that his insistence on excellence was based on sincere respect and the conviction that we were capable of meeting the high standards he set. We are both convinced that one of the things that made us realize that capability was Larry's refusal to accept anything less from us.

There are few scholars in our field whose web of collaborations extends as widely as Larry's, but nonetheless, being a member of that circle was always a point of pride. We knew that Larry thought we had the right stuff because of his willingness, despite the raft of colleagues with whom he worked, to continue to want to work with us. This was, perhaps, his highest tribute to us, and to everyone with whom he has interacted.

We chose to have Larry lead off this volume with a synopsis of his own work because it reflects what he has always seemed to do, that is, lead the way. Most of us who have worked with him would readily admit that it usually takes considerable effort to keep up with him. Indeed, we both often marvel at Larry's ability to master both the details and the big picture simultaneously. In Chapter 2, Bruce Tomblin has taken Larry as a guide in outlining a move away from simple reductionist accounts of disorders to more mechanistic explanations. Barbara Lewis, a long-time collaborator with Larry, then skillfully highlights the research into the genetic bases for speech sound disorders in Chapter 3. In Chapter 4, Ann Tyler examines the many facets of the comorbidity question and concludes with some practical suggestions about how one might deal with children who have problems that coexist with speech delay. Although Larry's work has long been viewed by some as highly theoretical, anyone who has worked

with him knows that his ultimate goal has always been to provide practicing clinicians with useful tools to help real children. Chapter 5 was written by Larry's long-time colleague, Ray Kent along with some of Ray's students and delves into acoustics, an approach to analysis that Larry has wholeheartedly embraced. Having long recognized the limitations of perceptual transcription, Larry began to develop acoustic measures in his lab in the mid-1990s and one look at his most recent list of diagnostic markers makes it obvious that they are serving him well. His most recent work with John-Paul Hosum (Chapter 6) is motivated by his desire to automate his data collection and analysis methods and further improve both the validity and reliability of his measures.

The last four chapters reflect work on some specific populations that has been directly inspired by Larry's work. The first of these (Chapters 7 and 8) both look at autism, a population of great current interest, but do so with an eye to speech produc-

tion which has received relatively minimal attention thus far. In Chapter 7, Velleman and colleagues look at motor speech disorders in autism. This work bears directly on Larry's recent work as chair of an expert panel put together by ASHA to improve our understanding of the nature of Childhood Apraxia of Speech (CAS); the panel concluded that some instances of CAS may be associated with neurodevelopmental disorders such as autism. In Chapter 8, Schoen et al. use acoustic methods to examine early output in the autism population. The penultimate Chapter 9 represents a homage to Larry's ability to always find the right measure for the job. Campbell and colleagues note that their work on growth curves that is helping them to understand traumatic brain injury in children would not be at all possible without Larry's measures and his willingness to share his data. We chose to conclude with a chapter on intelligibility (Chapter 10) because of the central role of intelligibility in Larry's conception of speech disorder.

Contributors

Mary V. Andrianopoulos, B.S., M.S., Ph.D., CCC-SLP

Associate Professor
Acting Graduate Program Director
Communication Disorders
University of Massachusetts at Amherst
Amherst, Massachusetts
Chapter 7

Keren E. Averback, M.S., CCC-SLP
Sharon, Maine
Chapter 7

Marcil J. Boucher, B.S.
Graduate Student
University of Massachusetts at Amherst
Amherst, Massachusetts
Chapter 7

Thomas F. Campbell, Ph.D.
Professor, School of Behavioral and Brain Sciences
Executive Director, Callier Center for Communication Disorders
University of Texas at Dallas
Dallas, Texas
Chapter 9

Katrzyna Chawarska, Ph.D.
Assistant Professor
Yale University School of Medicine
Child Study Center
Yale University
New Haven, Connecticut
Chapter 8

Morten H. Christiansen, Ph.D.
External Professor, Santa Fe Institute
Co-Director, Cornell Cognitive Science Program

Associate Professor, Department of Psychology
Cornell University
Ithaca, New York
Chapter 2

Alyssa R. Currier, M.A., CCC-SLP
Speech-Language Pathologist
Center for Communication
Sanford, Maine
Chapter 7

Christine A. Dollaghan, Ph.D.
Professor, School of Behavioral and Brain Sciences
Callier Center for Communication Disorders
University of Texas at Dallas
Dallas, Texas
Chapter 9

Peter Flipsen, Jr., Ph.D., CCC-SLP
Associate Professor of Speech-Language Pathology
Department of Communication Sciences and Disorders and Education of the Deaf
Idaho State University
Pocatello, Idaho
Chapter 10

John-Paul Hosom, Ph.D.
Assistant Professor
Department of Computer Science and Electrical Engineering
Center for Spoken Language Understanding
OGI School of Science and Engineering
Oregon Health and Science University
Beaverton, Oregon
Chapter 6

Katherine C. Hustad, Ph.D., CCC-SLP
Assistant Professor
Department of Communicative Disorders
Waisman Center
University of Wisconsin-Madison
Madison, Wisconsin
Chapter 5

Janine E. Janosky, Ph.D.
Vice Provost for Research and Professor
of Mathematics
Office of Research and Sponsored Programs
Central Michigan University
Mount Pleasant, Michigan
Chapter 9

Raymond D. Kent, Ph.D.
Professor Emeritus
University of Wisconsin-Madison
Madison, Wisconsin
Chapter 5

Barbara A. Lewis, Ph.D., CCC-SLP
Associate Professor
Department of Communication Sciences
Case Western Reserve University
Cleveland, Ohio
Chapter 3

Courtney E. Lippe, M.A., CFYSLP
Graduate Student
University of Massachusetts at Amherst
Amherst, Massachusetts
Chapter 7

Michael J. Marsello, M.A., CCC-SLP
Research Assistant
University of Massachusetts
Speech Pathologist, Genesis Rehab.
Somerville, Massachusetts
Chapter 7

Luciana Pagan-Neves, M.A.
Graduate Student
Universidade de São Paulo
São Paulo, Brazil
Chapter 5

Rhea Paul, Ph.D., CCC-SLP
Professor
Child Study Center
Yale University School of Medicine
New Haven, Connecticut
Chapter 8

Jennifer J. Perkins, B.S.
Graduate Student
California State University, Northridge
Northridge, California
Chapter 7

Elizabeth Schoen, M.S., CCC-SLP
Research Associate
Yale Child Study Center
Yale University School of Medicine
New Haven, Connecticut
Chapter 8

Lawrence D. Shriberg, Ph.D.
Emeritus Professor of Speech
Pathology
Department of Communicative
Disorders
Principal Investigator, The Phonology
Project
Waisman Center
University of Wisconsin-Madison
Madison, Wisconsin
Chapter 1

J. Bruce Tomblin, Ph.D.
D.C. Priestersbach Distinguished
Professor of Liberal Arts and
Sciences
Department of Communication Sciences
and Disorders
University of Iowa
Iowa City, Iowa
Chapter 2

Ann A. Tyler, Ph.D.
Western Michigan University
Kalamazoo, Michigan
Chapter 4

Richard Van Emmerik, Ph.D.

University of Massachusetts at Amherst
Department of Kinesiology
Amherst, Massachusetts

Chapter 7

Shelley L. Velleman, BA, M.A., Ph.D.

Associate Professor
Communication Disorders
University of Massachusetts at Amherst
Amherst, Massachusetts

Chapter 7

Haydee Fiszbein Wertzner, Ph.D.

Faculdade de Filosofia
Letras e Ciências Humanas
Universidade de São Paulo
São Paulo, Brazil

Chapter 5