Preface and Acknowledgments

The long-range objective of our research program has been the study of the biological foundations of human language. At first glance, our studies may seem to take an unusual point of departure—the data come not from spoken language but from a language that has evolved outside of hearing and speech: American Sign Language, the visual-gestural language used by many deaf people in the United States. By investigating brain organization for sign language processing, we seek to illuminate spoken languages as well as signed languages and thus provide insight into brain organization for language in general.

Our view is that one window into brain functioning for language comes from examining its dissolution under conditions of brain damage. The subjects around whom this book centers are six deaf signers who have experienced strokes that impair the left or the right side of the brain. Such subjects, of course, are extremely rare—prelingually deaf signers are rare, and among those the few with unilateral brain damage even more scarce. When we began this study, it was unknown whether or not sign language disorders would follow from localized lesions to the brain, what forms these disorders might take, or what their underlying neural substrate might be.

We focus in this book on what we have learned from examining what are typically left- and right-hemisphere functions in hearing people, but we tailor this examination to the specific domain of deaf people who live in a silent world and communicate through a language of the hands expressed in space. We do not attempt to review the broader domain of studies of aphasia, although the field is now in a lively state of debate. The general issues are addressed by, for example, Arbib, Caplan, and Marshall (1982); Caplan, Lecours, and Smith (1984); Caramazza and Zurif (1978); Damasio and Geschwind (1984); Gardner et al. (1983); Kean (1985); and Marshall (1982). This book presents and elaborates on a specific set of case studies in the context of the interrelated disciplines of linguistics, cognitive psychol-

ogy, and neuroscience. Our studies provide new perspectives for an understanding of brain organization for language and for visuospatial functions.

One of the most important features of our research has been the close collaboration between hearing and deaf people. Over the course of our studies of the structure, processing, acquisition, and breakdown of American Sign Language, hundreds of deaf people have taken part in many different capacities: researchers, subjects, and informants. Our research group always involved deaf and hearing researchers, in constant interactions in sign language. Among those involved in our studies of sign aphasia are Ben Behan, Amy Bihrle, David Corina, Karen van Hoek, Cheryl Fleck, Leslie Jamison, Shelly Marks, Diane Lillo-Martin, Lucinda O'Grady, Maureen O'Grady, Carol Padden, Laura Petitto, Patricia Richey, Dennis Schemenauer, and James Tucker. The insights and contributions of these researchers are important to the studies presented here.

We are most grateful to the people who were so ready and eager to share their experiences with us: the six special deaf signers represented in this book and their families and friends. We appreciate their sharing personal information. At the same time, we have been careful to preserve their privacy; we have given them pseudonyms, and sometimes changed places and identifying information in irrelevant details. Similarly, the drawings of the sign errors are reconstructions and not semblances of the subjects themselves. Because brain-damaged deaf signers are so rare, we had to travel to different parts of the country to do our testing. The subjects were willing and eager to work with us, and we saw them as often as we could but never as often as we wished; therefore there are occasional gaps in our data. We appreciate the six subjects' willingness to have their stories told, in the interests of contributing to an understanding of deeper issues.

In a book that spans several years of research in an interdisciplinary field of studies, the debt we owe others is great. Many colleagues have contributed in important ways, including Robbin Battison, Emilio Bizzi, Elizabeth Criswell, Antonio Damasio, Hanna Damasio, Dean Delis, Jennings Falcon, Howard Gardner, Norman Geschwind, Harold Goodglass, Nancy Helms-Estabrook, John Hollerbach, Vicente Iragui, Edith Kaplan, Robert Knight, Mark Kritchevsky, Harlan Lane, Arlene Lazerson, Helen Neville, Carol Padden, Frank Phillips, and Edgar Zurif.

Some of the content of three chapters has appeared in previous publications: (1) U. Bellugi, H. Poizner, and E. S. Klima, "Brain organization for language: Clues from sign aphasia," *Human Neurobiology* 2:155–170 (1983); (2) H. Poizner, U. Bellugi, and V. Iragui,

"Apraxia and aphasia in a visual-gestural language," *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology* 246:R868–R883 (1984); (3) H. Poizner, E. Kaplan, U. Bellugi, and C. Padden, "Visual-spatial processing in deaf brain damaged signers," *Brain and Cognition* 3:281–306 (1984). All have been revised and rewritten for this book.

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