CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

Sign Language Phonology

A concise overview of key findings and ideas in sign language phonology and its contributions to related fields, including historical linguistics, morphology, prosody, language acquisition, and language creation. Working on sign languages not only provides important new insights on familiar issues, but also poses a whole new set of questions about phonology, because of the use of the visual communication modality. This book lays out the properties needed to recognize a phonological system regardless of its modality. Written by a leading expert in sign language research, the book describes the current state of the field and addresses a range of issues that students and researchers will encounter in their work, as well as highlighting the significant impact that the study of sign languages has had on the field of phonology as a whole. It includes lists of further reading materials, and a full glossary, as well as helpful illustrations that demonstrate the important aspects of sign language structure, even to the most unfamiliar of readers. A text that will be useful to both specialists and general linguists, this book provides the first comprehensive overview of the field.

DIANE BRENTARI is the Mary K. Werkman Professor in the Department of Linguistics at the University of Chicago. She is author or editor of six books including *Shaping Phonology* (co-edited with Jackson Lee, 2018), *Sign Languages: A Cambridge Language Survey* (Cambridge University Press, 2010), *A Prosodic Model of Sign Language Phonology* (1998) and *Foreign Vocabulary in Sign Languages: A Cross-linguistic Investigation of Word Formation* (2001).

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

KEY TOPICS IN PHONOLOGY

Key Topics in Phonology focuses on the main topics of study in phonology today. It consists of accessible yet challenging accounts of the most important issues, concepts and phenomena to consider when examining the sound structure of language. Some topics have been the subject of phonological study for many years and are re-examined in this series in light of new developments in the field; others are issues of growing importance that have not so far been given a sustained treatment. Written by leading experts and designed to bridge the gap between textbooks and primary literature, the books in this series can either be used in courses and seminars, or as one-stop, succinct guides to a particular topic for individual students and researchers. Each book includes useful suggestions for further reading, discussion questions and a helpful glossary.

Already Published in the Series:

Neutralization by Daniel Silverman

Underlying Representations by Martin Krämer

Intonation and Prosodic Structure by Caroline Féry

Phonological Tone by Lian-Hee Wee

Sign Language Phonology by Diane Brentari

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

Sign Language Phonology

DIANE BRENTARI
University of Chicago

CAMBRIDGE
UNIVERSITY PRESS

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314-321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi - 110025, India

103 Penang Road, #05-06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107534094
DOI: 10.1017/9781316286401

© Diane Brentari 2019

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2019
First paperback edition 2022

A catalogue record for this publication is available from the British Library

Library of Congress Cataloging in Publication data
Names: Brentari, Diane, author.
Title: Sign language phonology / Diane Brentari.
Description: New York, NY : Cambridge University Press, 2019. | Series: Key topics in phonology
Identifiers: LCCN 2019010022 | ISBN 9781107113473 (hardback)
Subjects: LCSH: Sign language. | American Sign Language. | Grammar, Comparative and general – Phonology. | BISAC: LANGUAGE ARTS & DISCIPLINES / Linguistics / Phonetics & Phonology.
Classification: LCC HV2474 .B724 2019 | DDC 419–dc23
LC record available at https://lccn.loc.gov/2019010022

ISBN 978-1-107-11347-3 Hardback
ISBN 978-1-107-53409-4 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

Contents

List of Figures *page x*
List of Tables *xvi*
Acknowledgments *xvii*

1 Introduction: Sign Language versus Gesture; Sign Language versus Speech 1
1.1 Introduction to the Topics of this Volume 1
1.2 Historical Perspectives on Sign Language Phonology 4
1.3 Sign Language and Gesture 6
1.3.1 Neuroimaging 9
1.3.2 Conventionalization 10
1.4 Sign Language and Speech at the Word Level 11
1.4.1 The Core Lexicon 13
1.4.2 The Spatial Lexicon 31
1.4.3 The Non-native Lexicon: Fingerspelling, Mouthings, and the Foreign Component 35
1.5 New Theoretical Contributions to Sign Language Phonology 39
1.5.1 Optimality Theory 39
1.5.2 Cognitive and Usage-Based Approaches 41
1.6 Summary 42
1.7 Further Reading 42

2 Modality Effects 44
2.1 Why Is Communication Modality So Important? 44
2.2 Signal Differences 46
2.3 Phonetic Differences: Perception 49
2.4 Phonetic Differences: Articulation 52
2.5 Complexity 55
2.5.1 Articulatory Complexity 55
2.5.2 Frequency as Complexity 57

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

2.5.3 Complexity as Expressed by Order of Acquisition 57
2.5.4 Complexity as Expressed by Phonological Structure 58
2.6 Prominence: Single versus Multiple Oscillators 58
2.7 Modality Effects on Phonology 60
2.7.1 Movements, Segments, Features: How Are They Organized? 60
2.7.2 Sonority 62
2.7.3 Sonority, Movement, and Syllable Nuclei 64
2.7.4 Syllable Weight 70
2.7.5 Morphophonology and Word Shape 72
2.8 Summary 74
2.9 Further Reading 74

3 Iconicity 75
3.1 Introduction to Central Issues of Iconicity in Sign Languages 75
3.1.1 Types of Iconicity 78
3.1.2 Avoiding the "Gesture-Is-Iconic/Language-Is-Not" Trap: Clarifying the Relevant Terms 79
3.2 Iconicity across the Lexicon 82
3.2.1 Iconicity in Word Building: Movement and Event Structure 84
3.2.2 Arbitrary Distribution of Orientation in Iconic Classifier Constructions 87
3.2.3 The Feature [Stacked] and Iconicity 88
3.3 Iconicity in the Grammar: Agreement 90
3.4 Iconicity in Sign Language Processing 94
3.5 Conclusion 96
3.6 Further Reading 97

4 Interfaces 99
4.1 Introduction to Interface Phenomena in Sign Languages 99
4.2 The Language–Gesture Interface 101
4.2.1 The *Inter*-modality Gestural Interface 101
4.2.2 The *Intra*-modality Gestural Interface 102
4.3 Interfaces of Phonology and Other Grammatical Components 106
4.3.1 Phonetics–Phonology Interface: Constrained Flexibility 107

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

4.3.2 Morphology–Phonology Interface *111*
4.3.3 Prosodic Units and Sentence/Discourse Meaning *120*
4.3.4 Nondominant Hand (H2)-Spread *126*
4.4 Conclusion *130*
4.5 Further Reading *131*

5 The Emergence of Phonology *132*
5.1 Introduction to the Issues *132*
5.2 Where Do Phonological Features and Phonological Patterns Come From? *138*
5.3 Applying Internal Phonological Principles to Emerging Sign Languages *141*
5.3.1 The Development of Grammatical Non-manuals and Their Alignment *142*
5.3.2 Dispersion and Handshape Morphology within the Phonemic Space *144*
5.3.3 Repetition: Loss and Reorganization of Iconicity in Distinguishing Nouns and Verbs *156*
5.4 External Pressures on a Phonological System *159*
5.4.1 Applying Principles External to the Phonological System in Emerging Sign Languages *160*
5.4.2 Are Internal or External Factors More Important in Emerging Phonologies? *162*
5.5 Conclusions *164*
5.6 Further Reading *165*

6 Sign Language Phonological Processing *166*
6.1 Introduction *166*
6.2 Language Processing of Phonological Units *167*
6.2.1 Production Evidence: Slips of the Hand *167*
6.2.2 Production Evidence: Tip-of-the-Finger Phenomena *168*
6.2.3 Perceptual Evidence: Movement *171*
6.2.4 Perceptual Evidence: Handshape *178*
6.3 Phonological Processing and Neighborhood Density *186*
6.4 Neurological Mapping of Sign Language Phonology *188*
6.5 Conclusions *198*
6.6 Further Reading *199*

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

7 Sign Language Acquisition 200
7.1 Introduction 200
7.2 Typical First-Language (L1) Acquisition 203
7.2.1 Iconicity in L1 Acquisition 204
7.2.2 IDS and Iconicity 204
7.2.3 Time Course of L1 Acquisition in ASL Phonology 206
7.2.4 Acquisition of Classifier Handshapes 212
7.2.5 Prosodic Acquisition 213
7.2.6 Acquisition of Fingerspelling 215
7.3 Second-Language (L2) Acquisition 218
7.3.1 L2 Acquisition of Sign Parameters 218
7.3.2 L2 Acquisition and Iconicity 220
7.3.3 Acquisition of Classifier Constructions in L2 Signers 222
7.3.4 Acquisition of Prosody in L2 Signers 222
7.4 The Critical Period for Language Acquisition and the "Phonological Bottleneck" 224
7.5 Connection between Sign Language Phonology and Reading 229
7.5.1 The Use of Spoken and Signed Phonological Codes in Deaf Readers 230
7.5.2 Cross-Modal Activation 234
7.5.3 Phonological Readiness for Reading in Deaf Children 236
7.6 Conclusions 239
7.7 Further Reading 240

8 Sign Language Phonological Variation and Change 241
8.1 Introduction 241
8.1.1 Sources of Data 242
8.1.2 Language Variation, Change, and Emergence 245
8.2 Synchronic Variation 246
8.2.1 Synchronic Variation Based on Linguistic Factors 246
8.2.2 Synchronic Variation Based on Sociolinguistic Factors 249
8.3 Diachronic Change 253
8.3.1 Frishberg's Contribution 253
8.3.2 Further Developments in ASL Historical Studies 258
8.4 Combining Synchronic and Diachronic Sources 261

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

8.5 Conclusions *266*
8.6 Further Reading *267*
8.7 Further Corpus Information *267*

Glossary *269*
References *274*
Index *318*

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

Figures

1.1 The two ASL stems THINK (left) and SELF (center), which form the compound THINK^SELF *page 5*
1.2 Possible mechanisms that can facilitate conventionalization of the signifier-signified relationship *10*
1.3 The three components of a sign language lexicon *12*
1.4 Minimal pair contrasts in American Sign Language (ASL) and British Sign Language (BSL) *16*
1.5 Confusion matrix of phonological features employed in Lane et al. (1976) *22*
1.6 The features and parameters of ASL represented as a flat structure (ca. 1980) *23*
1.7 The ASL sign INFORM *24*
1.8 Four post-Stokoe models of sign language phonological representation *25*
1.9 Hierarchical organization of selected fingers and orientation *28*
1.10 Binary branching nodes of the handshape feature structure in the Prosodic model (Brentari, 1998) *29*
1.11 Polymorphemic classifier predicate in ASL meaning *two-people–hunched–go forward–carefully* *32*
1.12 The timing of the two hands' articulation in classifier constructions hints at constituent structure *34*
1.13 The ASL manual alphabet *36*
1.14 The BSL manual alphabet *36*
1.15 Partially lexicalized fingerspelled forms in BSL and ASL *37*
1.16 Closed and open variants of -E- in ASL fingerspelling *38*
2.1 Typical and distalized production of the ASL sign HARD *54*
2.2 The joints of the arm that generate movements in sign languages, from largest to smallest with their associated phonological features *59*

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

2.3 The hierarchical organization of movement subtypes in the Prosodic model *61*
2.4 Results from Berent et al. (2008) for Korean, showing that a spoken language with no consonant clusters respects the Sonority Sequencing Principle (SSP) *63*
2.5 (repeated from Figure 1.1) THINK has a movement when produced as a single sign, but not in the compound THINK^SELF *65*
2.6 The full and reduced fingerspelled form in ASL for P-H-O-N-O-L-O-G-Y *66*
2.7 Sample stimuli from Berent et al. (2013) with four possible combinations of syllables and morphemes *68*
2.8 Results from the four experiments in Berent et al. (2013) *69*
2.9 Examples of word structure in the four types of languages, resulting from crossing the number of syllables with the number of morphemes *73*
3.1 The distinctive use of the [direction] feature in the ASL minimal pair TEND and BE-MOVED/TOUCHED *81*
3.2 Telic and atelic verbs according to the Event Visibility Hypothesis (Wilbur, 2010) and their schematic phonological representations *85*
3.3 Distribution of phonological and morphological uses of orientation in ASL classifier predicates *88*
3.4 Examples of [stacked] handshapes in the three components of the ASL lexicon *90*
3.5 Examples of morphological use of the [direction] feature in ASL *91*
3.6 Examples of the phonological expression of verb agreement in ASL *92*
3.7 Sample stimuli from Bosworth & Emmorey (2010) showing semantically related iconic, semantically related non-iconic, and unrelated non-iconic ASL signs *96*
3.8 Possible mechanisms that can facilitate conventionalization of the signifier–signified relationships *97*
4.1 Three forms of UNDERSTAND: the citation form, UNDERSTAND-A-LITTLE, and UNDO–UNDERSTANDING utilizing phonemic features of the handshape *103*
4.2 Handshapes in core, foreign, and spatial vocabulary to investigate phonetic preferences *108*
4.3 The [stacked] feature used allophonically in the ASL "core" sign SEE *109*

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

4.4 Flexion of the metacarpal joint used allophonically in two ASL classifier forms: *person move away* and *person come towards* 110
4.5 Examples of different forms of Prosodic words in ASL 115
4.6 The ASL sentence BOY SAY YOU MY FRIEND without and with a point-of-view predicate 118
4.7 Changes in the non-manual markers between the two I-phrases in a conditional phrase of Israeli Sign Language 124
4.8 The progressive spread of the nondominant hand in a phonological phrase in ASL 127
4.9 The progressive spread of the nondominant hand in two parenthetical phrases in ASL 128
4.10 The proportion of H2-Spread in conversation and in narratives in Sign Language of the Netherlands 129
5.1 Descriptions of motion and location events by an American gesturer and a signer of ASL 133
5.2 Examples of object handshapes and handling handshapes 146
5.3 Feature organization for joints and selected fingers within the Handshape structure of the Prosodic model 146
5.4 Handshapes with low, medium, and high joint complexity within the Handshape structure of the Prosodic model 147
5.5 Handshapes with low, medium, and high selected finger complexity within the Handshape structure of the Prosodic model 147
5.6 Examples of low-, medium-, and high-complexity handshapes for joints and selected fingers 148
5.7 Examples of vignettes used to elicit object handshapes (left) and handling handshapes (right) 149
5.8 Average overall complexity across adult study groups in Nicaragua 150
5.9 Joint and selected finger complexity across signers and gesturers in the United States, China, Italy, and Nicaragua 152
5.10 Selected finger complexity in adult signers, homesigners, and gesturers 154
5.11 Average finger group complexity for a single Nicaraguan child at five time points 154
5.12 Comparison of NSL1, NSL 2, and NSL3 signers on the four types of devices used to express the noun–verb distinction 157
5.13 Comparison of homesigners on the four types of devices used to express the noun–verb distinction 158

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

5.14 Two variants of DOG and one family's form of EGG in Al-Sayyid Bedouin Sign Language *161*
6.1 A slip of the hand in German Sign Language involving regressive assimilation of the whole handshape *170*
6.2 A slip of the hand in ASL involving regressive assimilation of the selected fingers *170*
6.3 Perceptual salience judgments from signers and non-signers for lexical and morphological movements *174*
6.4 Example stimuli of Berent et al. (2016) *177*
6.5 The two parts of an ideal categorical perception result *179*
6.6 Handshape intervals for a phonemic and allophonic handshape pair in ASL *181*
6.7 Example stimuli from Best et al. (2010) with intervals for a spread and unspread handshape (pseudosigns) *182*
6.8 Sample stimuli from the animated video stimuli used in Morford et al. (2008) with intervals for a phonemic handshape pair in ASL *182*
6.9 Sample stimuli from McCullough and Emmorey (2009) showing intervals for ASL grammatical and affective facial expressions *183*
6.10 Example stimulus handshapes and signs used in Eccarius (2008) for flat and round handshapes *185*
6.11 Regions in the left hemisphere attributed to language processing *190*
6.12 Phonemic substitutions in selected finger specifications for handshapes produced by an aphasic ASL signer *192*
6.13 Example stimuli from MacSweeney et al. (2004) showing sequences of complex forms in a nonlinguistic system ("TicTac") and British Sign Language (BSL) *194*
6.14 Stimuli from the three tasks in MacSweeney et al. (2008) to assess phonological processing in BSL *195*
7.1 Low- and high-frequency cyclical movements in sign- and speech-exposed infants *207*
7.2 Error rates on the three manual parameters of signs in four deaf children of deaf parents *209*
7.3 Stages of handshape acquisition *211*
7.4 Recall of fingerspelled English words in deaf readers when similarity/dissimilarity was based on spoken English or on the manual form of the fingerspelled word *217*
7.5 Mean frequency of proximalization versus distalization of movement in the imitation of single- and

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

multiple-jointed ASL signs in deaf and hearing L2 learners 219
7.6 The interaction between iconicity and complexity in L2 BSL production 221
7.7 Schema of the hypotheses considered in Brentari et al. (2012b) regarding the prosodic patterns of L1 deaf, L1 hearing, and L2 hearing ASL signers 223
7.8 Evidence for the "phonological bottleneck." Effects of late L1 acquisition showing that as age of acquisition of an L1 increases, the number of phonological errors increases, and semantic errors decrease 227
7.9 Mean phonological and semantic priming effects for ASL sign recognition as a function of age of acquisition 228
7.10 Sample items from the phoneme judgment task and phoneme manipulation task reported in Hirshorn et al. (2015) 232
8.1 Variants of the ASL sign ANGRY showing historical change from a one- to a two-handed variant and then back to a one-handed variant again 245
8.2 The ASL sentence translated into English as *I cook* articulated in citation form and with regressive assimilation 247
8.3 The ASL sign DEAF in citation form and in two non-citation variants 248
8.4 The ASL sign KNOW in citation form and in a non-citation variant after undergoing the phonological rule of displacement 249
8.5 The grid used in McCaskill et al. (2011) to determine if a sign was produced in "typical" signing space or in a larger signing space, illustrated by two variants of the ASL sign LIGHT 250
8.6 The ASL sign QUIET in citation form and after undergoing the phonological rule of Weak Drop 251
8.7 Normalized pairwise variability index plotted for Sign Variety ((m)ainstream, (b)lack), Age (older (squares), younger (circles)), and Gender ((m)ale, (f)emale) for twenty-three individuals 252
8.8 Phonological changes from Old French Sign Language (O-FSL) to Modern ASL (ca. 1965) showing a move towards concentration of lexical information on the hands in the sign COMPARE 255

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

8.9 Phonological changes from Old French Sign Language (O-FSL) to Modern ASL (ca. 1965) showing displacement toward the midline in the ASL sign HELP (top) and SWEETHEART (bottom) *256*
8.10 A Type 3, Type 2, and Type 1 two-handed version of the ASL sign WHISKEY *257*
8.11 (repeated from Figure 1.1) The two ASL stems THINK (left) and SELF (center), which form the compound THINK^SELF translated as *decide for oneself* (right). The compound (right) has two morphemes but just one syllable, just one movement *258*
8.12 Three historical variants of the ASL sign WHO *259*
8.13 Historically related ASL signs (left) WHICH, WITH, and BOSS/CHIEF *260*
8.14 The ASL sign FULL and Italian Sign Language sign BOTTLE. Both signs have undergone phonological change, whereby both hands move in a symmetrical fashion *264*
8.15 Form of the sign BIRTHDAY used by older and younger signers of LIS *264*
8.16 Form of SIGN LANGUAGE used by older and younger signers of Italian Sign Language (LIS) showing a change to a relatively more marked handshape *265*

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

Tables

2.1 Differences between signed and spoken languages at the level of the signal, phonetic system, and phonological system *page 46*
4.1 Differences between affective and grammatical facial expressions *105*
4.2 Morpho-syntactic and corresponding prosodic units *107*
4.3 The distribution of the number of morae in core lexical stems of FinSL *113*
5.1 Narrative by one of the first users of Al-Sayyid Bedouin Sign Language (ABSL; cf. Sandler et al., 2011b) *142*
5.2 Narrative by one of the two older signers of ABSL (cf. Sandler et al., 2011b) *143*
5.3 Narrative by one of the two younger signers of ABSL (cf. Sandler et al., 2011b) *144*
6.1 Comparison of signed and spoken language "slips" in German Sign Language and German *169*
7.1 Sample sentence pairs for the discrimination task reported in Boechner et al. (2011) *220*

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-53409-4 — Sign Language Phonology
Diane Brentari
Frontmatter
More Information

Acknowledgments

I would like to thank my colleagues who provided support while I was preparing this manuscript by reading chapters or helping with the manuscript preparation itself (in alphabetical order): Iris Berent, Rain Bosworth, Marie Coppola, Karen Emmorey, Jordan Fenlon, Laura Horton, Aurora Martinez del Rio, Kathryn Montemurro, and Gary Morgan. Also, special thanks to my sign language phonology seminar in the fall of 2018 that helped me iron out the final kinks of the text and to Petra Eccarius who assisted with excellent comments, as well as editorial and logistical help. All of you helped to make the text clearer and more readable. All of the mistakes are my own.

I'd like to acknowledge my funding sources that helped support this work over the years from NSF grants 0112391, 0547554, 1227908, and 1400998. I would also like to thank the Center for Gesture Sign and Language at the University of Chicago, particularly my co-directors Susan Goldin-Meadow and Anastasia Giannakidou, for the most stimulating group of colleagues and students one could ever hope for.

I am extremely grateful to Susan Elizabeth Rangel and David Reinhart for being the sign language models for the original photos in this book, and to Andrew Gabel, Rita Mowl, Drucilla Ronchen, and Robin Shay for their help and advice on many issues concerning ASL and the Deaf community. And a big thank you also goes to all of the deaf and hearing people – too numerous to name – who helped with this research over these last twenty years in Nicaragua, Italy, the United Kingdom, Hong Kong, and many other sites. Without your patience and generosity, this work would not be possible.

And, always, thank you to my husband and conversation partner in all things, Arnold I. Davidson, who is a constant reminder of not only how important the life of the mind is but also how important it is to have someone with whom to share it.

© in this web service Cambridge University Press www.cambridge.org