Brief Contents

- 1 Science, Language, and the Science of Language 1
- 2 Origins of Human Language 9
- 3 Language and the Brain 55
- 4 Learning Sound Patterns 105
- **5** Learning Words 145
- 6 Learning the Structure of Sentences 185
- 7 Word Recognition 233
- 8 Understanding Sentence Structure and Meaning 279
- 9 Speaking: From Planning to Articulation 329
- 10 Discourse and Inference 373
- 11 The Social Side of Language 421
- 12 Language Diversity 471

Contents

CHAPTER 1 Science, Language, and the Science of Language 1

BOX 1.1 ■ Wrong or insightful? Isaac Asimov on testing students' knowledge 2

1.1 What Do Scientists Know about Language? 3

1.2 Why Bother? 5

CHAPTER 2 Origins of Human Language 9

2.1 Why Us? 11

BOX 2.1 ■ Hockett's design features of human language 13

METHOD 2.1 ■ Minding the gap between behavior and knowledge 17

2.2 The Social Underpinnings of Language 19

BOX 2.2 ■ Dogs versus chimps: A pointed difference 20

METHOD 2.2 ■ Exploring what primates can't (or won't) do 24

2.3 The Structure of Language 24

BOX 2.3 ■ The recursive power of syntax 27

LANGUAGE AT LARGE 2.1 ■ Engineering the perfect language 30

2.4 The Evolution of Speech 31

BOX 2.4 ■ Practice makes perfect: The "babbling" stage of human infancy 33

BOX 2.5 ■ What can songbirds tell us about speaking? 36

2.5 How Humans Invent Languages 37

LANGUAGE AT LARGE 2.2 ■ From disability to diversity: Language studies and deaf culture 43

2.6 Survival of the Fittest Language? 44

BOX 2.6 ■ Evolution of a prayer 45
BOX 2.7 ■ Reflexive markers in Germanic languages 49

DIGGING DEEPER ■ Language evolution in the lab 51

CHAPTER 3

Language and the Brain 55

3.1 What Can Genetic Disorders Tell Us about Brain Systems? 57

BOX 3.1 ■ Linguistic and non-linguistic impairments in Williams and Down syndromes 60

METHOD 3.1 ■ Drawing comparisons across populations 61

BOX 3.2 ■ Dyslexia: Is there a gene for reading? 65

3.2 Where in the Brain Is Language? 67

BOX 3.3 ■ Phineas Gage and his brain 68

LANGUAGE AT LARGE 3.1 ■ One hundred names for love: Aphasia strikes a literary couple 73

3.3 Mapping the Healthy Human Brain 75

BOX 3.4 Then and now: Measuring brain activity through blood flow 78

METHOD 3.2 ■ Comparing apples and oranges in fMRI 79

BOX 3.5 ■ The functional neuroanatomy of language 85

LANGUAGE AT LARGE 3.2 ■ Brain bunk:
Separating science from pseudoscience 89

3.4 The Brain in Real-Time Action 92

BOX 3.6 ■ A musical P600 effect 100

LANGUAGE AT LARGE 3.3 We Using EEG to assess patients in a vegetative state 101

DIGGING DEEPER ■ Language and music 102

CHAPTER 4 Learning Sound Patterns 105

4.1 Where Are the Words? 107

METHOD 4.1 ■ The head-turn preference paradigm 108

BOX 4.1 ■ Phonotactic constraints across languages 114

4.2 Infant Statisticians 115

BOX 4.2 ■ ERPs reveal statistical skills in newborns 120

4.3 What Are the Sounds? 121

LANGUAGE AT LARGE 4.1 ■ The articulatory phonetics of beatboxing 125
BOX 4.3 ■ Vowels 128

METHOD 4.2 ■ High-amplitude sucking 132
BOX 4.4 ■ Categorical perception in chinchillas 133

4.4 Learning How Sounds Pattern 135

BOX 4.5 ■ Allophones in complementary distribution: Some cross-linguistic examples 137 DIGGING DEEPER ■ Statistics, yes, but what kind

CHAPTER 5 Learning Words 145

5.1 Words and Their Interface to Sound 147

BOX 5.1 m The 30-million-word gap 151

5.2 Reference and Concepts 152

LANGUAGE AT LARGE 5.1 ■ How different languages cut up the concept pie 156

BOX 5.2 ■ Word learning in dogs 160

5.3 Understanding Speakers' Intentions 161

METHOD 5.1 ■ Revisiting the switch task 164

LANGUAGE AT LARGE 5.2 ■ Learning language from machines 166

5.4 Parts of Speech 168

of statistics? 140

5.5 Words: Some Assembly Required 170

BOX 5.3 ■ The structure inside words 173

5.6 Words versus Rules 175

BOX 5.4 ■ Separate brain networks for words and rules? 177

LANGUAGE AT LARGE 5.3 ■ McLanguage and the perils of branding by prefix 180

DIGGING DEEPER ■ The chicken-and-egg problem of language and thought 181

CHAPTER 6

Learning the Structure of Sentences 185

6.1 The Nature of Syntactic Knowledge 186

BOX 6.1 ■ Stages of syntactic development 187

LANGUAGE AT LARGE 6.1 ■ Constituent structure and poetic effect 193

BOX 6.2 ■ Rules for constructing sentences of English 197

BOX 6.3 ■ A language without recursion? 199

6.2 Learning Grammatical Categories 200 BOX 6.4 ■ Science is *not* a verb 203

6.3 How Abstract Is Early Syntax? 206 BOX 6.5 ■ Quirky verb alternations 212 BOX 6.6 ■ Syntax and the immature brain 215

6.4 Complex Syntax and Constraints on Learning 216

BOX 6.7 ■ Specific language impairment and complex syntax 218

METHOD 6.1 ■ The CHILDES database 224

LANGUAGE AT LARGE 6.2 ■ Language universals, alien tongues, and learnability 227

DIGGING DEEPER ■ Domain-general and domain-specific theories of language learning 229

CHAPTER 7 Word Recognition 233

7.1 A Connected Lexicon 234

METHOD 7.1 ■ Using the lexical decision task 240 BOX 7.1 ■ Words: All in the mind, or in the body too? 243

7.2 Ambiguity 244

BOX 7.2 ■ Why do languages tolerate ambiguity? 245

LANGUAGE AT LARGE 7.1 ■ The persuasive power of word associations 250

7.3 Recognizing Spoken Words in Real Time 252

BOX 7.3 ■ Do bilingual people keep their languages separate? 256

7.4 Coping with the Variability of Sounds 260

LANGUAGE AT LARGE 7.2 ■ How does ventriloquism work? 264

7.5 Reading Written Words 265

BOX 7.4 Reading chicken scratch 266

BOX 7.5 ■ Do different writing systems engage the brain differently? 268

LANGUAGE AT LARGE 7.3 ■ Should English spelling be reformed? 272

DIGGING DEEPER ■ The great modular-versus-interactive debate 275

CHAPTER 8 Understanding Sentence Structure and Meaning 279

8.1 Incremental Processing and the Problem of Ambiguity 281

BOX 8.1 Me Key grammatical terms and concepts in English 284

LANGUAGE AT LARGE 8.1
☐ Crash blossoms run amok in newspaper headlines 287

METHOD 8.1 ■ Using reading times to detect misanalysis 288

8.2 Models of Ambiguity Resolution 289

BOX 8.2 ■ Not all reduced relatives lead to processing implosions 294

8.3 Variables That Predict the Difficulty of Ambiguous Sentences 295

BOX 8.3 ■ Subliminal priming of a verb's syntactic frame 298

BOX 8.4 ■ Doesn't intonation disambiguate spoken language? 304

8.4 Making Predictions 306

8.5 When Memory Fails 313

LANGUAGE AT LARGE 8.2 ■ Straining the parser for literary effect 316

8.6 Variable Minds 317

BOX 8.5 ■ Bilingualism and cognitive control 321

LANGUAGE AT LARGE 8.3 ■ A psycholinguist walks into a bar... 324

DIGGING DEEPER ■ Knowledge versus processing 325

CHAPTER 9

Speaking: From Planning to Articulation 329

9.1 The Space between Thinking and Speaking 331

BOX 9.1 ■ What spoken language really sounds like 332

LANGUAGE AT LARGE 9.1 ■ The sounds of silence: Conversational gaps across cultures 333

9.2 Ordered Stages in Language Production 337

BOX 9.3 ■ Common types of speech errors 338 BOX 9.3 ■ Learning to fail at speaking 342

9.3 Structuring Sentences 346

METHOD 9.1 ■ Finding patterns in real-world language 350

LANGUAGE AT LARGE 9.2 ■ Language detectives track the unique "prints" of language users 355

9.4 Putting the Sounds in Words 356

METHOD 9.2 ■ The SLIP technique 358
BOX 9.4 ■ Was Freud *completely* wrong about speech errors? 363

LANGUAGE AT LARGE 9.3 ■ George W. Bush: A modern-day Reverend Spooner? 364

BOX 9.5 ■ Patterns in speech errors 367

DIGGING DEEPER ■ Planning ahead 368

CHAPTER 10 Discourse and Inference 373

10.1 From Linguistic Form to Mental Models of the World 375

BOX 10.1 ■ Individual differences in visual imagery during reading 382

METHOD 10.1 ■ Converging techniques for studying mental models 384

10.2 Pronoun Problems 387

LANGUAGE AT LARGE 10.1 ■ What does it mean to be literate? 388

BOX 10.2 ■ Pronoun systems across languages 391 BOX 10.3 ■ The scientific study of mumbling 393

10.3 Pronouns, Ambiguity, and Real-Time Processing 397

BOX 10.4 ■ Pronoun types and structural constraints 403

10.4 Drawing Inferences and Making Connections 404

LANGUAGE AT LARGE 10.2 ■ The Kuleshov effect: How inferences bring life to film 406

LANGUAGE AT LARGE 10.3 ■ Presuppositions and President Clinton's re-election 409

BOX 10.5 ■ Using brain waves to study the time course of discourse processing 412

DIGGING DEEPER ■ Shallow processors or builders of rich meaning? 417

CHAPTER 11

The Social Side of Language 421

11.1 Tiny Mind Readers or Young Egocentrics? 423

BOX 11.1 ■ Social gating is for the birds 427

METHOD 11.1 ■ Referential communication tasks 432

BOX 11.2 ■ Does language promote mind reading? 434

11.2 Conversational Inferences: Deciphering What the Speaker Meant 435

LANGUAGE AT LARGE 11.1 ■ Absurdity, intent, and meaning in art 439

LANGUAGE AT LARGE 11.2

■ On lying and implying in advertising 440

BOX 11.3 ■ Examples of scalar implicature 442

BOX 11.4 ■ Using conversational inference to resolve ambiguity 446

11.3 Audience Design 450

BOX 11.5 ■ Do speakers consider hearers' needs in deciding when to mumble? 453

LANGUAGE AT LARGE 11.3 ■ Why are so many professors bad at audience design? 458

11.4 Dialogue 459

DIGGING DEEPER ■ Autism research and its role in mind-reading debates 467

CHAPTER 12 Language Diversity 471

LANGUAGE AT LARGE 12.1 ■ The great language extinction 472

12.1 What Do Languages Have in Common? 475

BOX 12.1 ■ Language change through language contact 477

12.2 Explaining Similarities across Languages 481

BOX 12.2 ■ Do genes contribute to language diversity? 487

12.3 Words, Concepts, and Cultures 492

BOX 12.3 ■ Variations in color vocabulary 495

12.4 Adjusting the Language Dial 501

BOX 12.4 ■ ERP evidence for language effects on perception 502

METHOD 12.1 ■ Language intrusion and the variable Whorf effect 508

12.5 One Mind, Two Languages 509

BOX 12.5 ■ Mark Twain on the awful memory-taxing syntax of German 513

LANGUAGE AT LARGE 12.2 ■ Can your language make you broke and fat? 514

DIGGING DEEPER ■ Are all languages equally complex? 517

Glossary 521

Literature Cited 531

Photo Credits 545

Author Index 546

Subject Index 549