

Contents

<i>List of figures</i>	<i>page</i> viii
<i>List of tables</i>	x
<i>Copyright acknowledgements</i>	xi
<i>Preface</i>	xiii
I Introduction	
1 Genesis	3
2 Instinctive phonology	9
2.1 People possess knowledge of sound patterns	9
2.2 Productivity	11
2.3 Regeneration	12
2.4 Shared design	18
2.5 Unique design	28
2.6 Phonological knowledge lays the foundation for the cultural invention of writing and reading	32
3 The anatomy of the phonological mind	35
3.1 The phonological grammar is a core algebraic system	35
3.2 Phonology is a core system	44
3.3 Domain-general and non-algebraic alternatives	49
3.4 Rebuttals and open questions	55
3.5 A roadmap	58
II Algebraic phonology	
4 How phonological categories are represented: the role of equivalence classes	63
4.1 What are phonological patterns made of?	63
4.2 The role of syllables	65
4.3 The dissociations between consonants and vowels	73
4.4 Conclusions and caveats	82

vi	Contents	
5	How phonological patterns are assembled: the role of algebraic variables in phonology	84
5.1	How do phonological categories combine to form patterns?	84
5.2	A case study: the restriction on identical root consonants in Hebrew	87
5.3	The restriction on identical consonants generalizes to native Hebrew consonants	91
5.4	The restriction on identical consonants generalizes across the board	97
5.5	Coda: on the role of lexical analogies	111
5.6	Conclusion	113
 III Universal design: phonological universals and their role in individual grammars		
6	Phonological universals: typological evidence and grammatical explanations	117
6.1	Phonological universals in typology: primitives and combinatorial principles	119
6.2	Grammatical accounts for typological universals	123
6.3	Non-grammatical explanations for language universals	131
6.4	Why are phonological universals non-absolute?	132
6.5	Algebraic, phonological universals are autonomous from phonetic pressures	139
6.6	Conclusion	147
7	Phonological universals are mirrored in behavior: evidence from artificial language learning	149
7.1	Phonological interactions target segments that share features	151
7.2	Learners favor directional phonological changes	155
7.3	Learners favor phonetically grounded interactions	158
7.4	Discussion	160
8	Phonological universals are core knowledge: evidence from sonority restrictions	165
8.1	Grammatical universals and experimental results: correlation or causation?	165
8.2	Sonority restrictions are active in spoken languages: linguistic and typological evidence	166
8.3	Broad sonority restrictions are active in the grammars of individual speakers: experimental evidence	176
8.4	Summary and conclusions	196
 IV Ontogeny, phylogeny, phonological hardware, and technology		
9	Out of the mouths of babes	201
9.1	Computational machinery	202
9.2	Gauging core phonology: some ground rules	204
9.3	Phonological primitives	205
9.4	Universal combinatorial principles: some markedness reflexes	213
9.5	Conclusions	223

Contents	vii
10 The phonological mind evolves	226
10.1 The human phonological instinct from a comparative perspective	226
10.2 Is phonological patterning special?	228
10.3 The evolution of the phonological mind	247
11 The phonological brain	251
11.1 Individuating cognitive functions: functional specialization vs. hardware segregation	251
11.2 The phonological network of spoken language	254
11.3 Is the phonological network dedicated to phonological computation?	265
11.4 Minds, and brains, and core phonology	275
12 Phonological technologies: reading and writing	280
12.1 Core knowledge as a scaffold for mature knowledge systems	280
12.2 Writing systems recapitulate core phonology	283
12.3 Reading recovers phonological form from print	287
12.4 Reading recruits the phonological brain network	295
12.5 Grammatical phonological reflexes in reading	296
12.6 Conclusion	305
13 Conclusions, caveats, questions	307
13.1 Phonological instincts: what needs to be explained	307
13.2 Some explanations	309
13.3 The core phonology hypothesis: some open questions	311
<i>References</i>	316
<i>Index</i>	352

Figures

2.1 The emergence of movement in ABSL (from Sandler, 2011)	<i>page</i> 15
2.2 Two classifiers for object vs. handling of an object	16
2.3 Twinkle, Twinkle, Little Star	31
3.1 The use of atomic shapes as symbols for singleton phonemes, either specific phoneme instances (a) or phoneme categories (b)	40
3.2 The use of atomic shapes to encode geminates	41
3.3 The use of complex shapes to encode geminates	41
3.4 The representation of semantic complexity using forms that are either syntactically complex (on the left) or simple (on the right)	50
4.1 The prosodic structure of multisyllabic words	67
4.2 An illustration of the cohorts activated by the initial syllable of two Spanish words	71
4.3 Color naming as a function of the CV-skeletal structure (from Marom & Berent, 2010, Experiments 1 & 3)	78
5.1 The formation of the root <i>smm</i> from <i>sm</i>	88
5.2 Rating result for novel roots generated from nonnative consonants (from Berent et al., 2002, Experiment 2)	103
5.3 Rating result of novel roots generated from roots with the nonnative phoneme /θ/ (Data from Berent et al., 2002, Experiment 2)	105
6.1 The distinction between syllable and morphological structure in American Sign Language	144
8.1 Response accuracy in the syllable count task (from Berent et al., 2007a)	182
8.2 Response accuracy and response time to non-identity trials in the identity-judgment task (from Berent et al., 2007a)	183
8.3 The phonetic vs. phonological accounts of misidentification	188
8.4 The effect of task demands on the misidentification of ill-formed onsets (from Berent et al., 2012a)	191

List of figures	ix
8.5 The effect of phonological ill-formedness on the identification of printed materials (from Berent & Lennertz, 2010, Experiment 1)	193
8.6 The sensitivity of Korean speakers to the sonority hierarchy in an identity-judgment task (from Berent et al., 2008)	195
9.1 The effect of markedness on response accuracy to unattested onsets in the “unsuccessful imitation” condition (Berent et al., 2011a)	223
10.1 The hierarchical structure of the Zebra Finch song (from Berwick et al., 2011)	228
10.2 Learned variations in song patterns of Swamp Sparrows (from Balaban, 1988a)	236
11.1 Two cartoon accounts of the relationship between two cognitive functions – phonology and audition – and their hardware implementation	252
11.2 Functional anatomy of left hemisphere areas engaged in the phonological processing in spoken language and their interconnectivity (from Hickok & Poeppel, 2007)	255
11.3 The design of Phillips et al.’s experiments (2000)	258
11.4 Brain responses to the phonological and acoustic control conditions in Phillips et al.’s (2000) experiments.	258
12.1 Lexical access from print	288
12.2 Reading without phonology	289
12.3 Two routes to phonology from print: assembled and addressed phonology	291

Tables

3.1 The contingency between geminate consonants and their singleton counterparts in the <i>UCLA Phonological Segment Inventory Database</i>	page 43
4.1 An illustration of the materials in illusory conjunctions	67
4.2 An illustration of the materials in Marom & Berent (2009)	77
5.1 The structure of Hebrew words	87
5.2 An illustration of various word classes, generated by inserting a root in various word patterns	93
6.1 Tone-bearing capacity of syllables in Standard Thai and Navajo as a function of the duration of the nucleus, coda, and rhyme (in ms) (from Zhang, 2004)	138
6.2 The distinction between syllable structure and morphological structure in spoken language	143
7.1 English phonemes and diphthongs (following Hayes, 2009)	152
7.2 The design of Finley and Badecker’s experiments (from Finley & Badecker, 2008; 2010)	157
7.3 The design of Wilson’s (2006) palatalization experiment	159