

# Contents

<i>List of figures</i>	<i>page</i> xi
<i>Map</i>	xiv
<i>List of tables</i>	xv
<i>Preface</i>	xvii
<i>Acknowledgements</i>	xx
<i>List of abbreviations</i>	xxii
<i>List of symbols</i>	xxiv
<b>1 Pitch in Humans and Machines</b>	1
1.1 Introduction	1
1.2 Frequency of vocal fold vibration, fundamental frequency ( $F_0$ ), and pitch	1
1.3 Pitch tracks	3
1.4 Interpreting pitch tracks	5
1.5 Experimentation	10
1.6 Conclusion	11
<b>2 Pitch in Language I: Stress and Intonation</b>	12
2.1 Introduction	12
2.2 Stress	12
2.3 Intonation	22
<b>3 Pitch in Language II: Tone</b>	26
3.1 Introduction	26
3.2 Tone languages	26
3.3 Autosegmental representations of tone	28
3.4 Other sequential restrictions	36
3.5 Accent	36

3.6 Tonogenesis	42
3.7 Conclusion	47
<b>4 Intonation and Language</b>	49
4.1 Introduction	49
4.2 Intonation and the design features of language	50
4.3 A half-tamed savage	57
4.4 Experimental approaches towards establishing discreteness in intonation	62
4.5 Conclusion	69
<b>5 Paralinguistics: Three Biological Codes</b>	71
5.1 Introduction	71
5.2 Variation beyond the speaker's control	72
5.3 Motivations for control in speech production	72
5.4 Pitch register and pitch span	76
5.5 Biological codes in pitch variation	79
5.6 The Frequency Code	80
5.7 The Effort Code	85
5.8 The Production Code	89
5.9 Substitute phonetic features	90
5.10 Language-specific universal meaning?	92
5.11 Conclusion	93
<b>6 Downtrends</b>	97
6.1 Introduction	97
6.2 Declination	98
6.3 Downstep	100
6.4 Final lowering	110
6.5 Initial high pitch: reset	113
6.6 Three phonetic issues	116
6.7 Conclusion	121
<b>7 Tonal Structures</b>	123
7.1 Introduction	123
7.2 Historical background	125
7.3 Developments since 1986	133
7.4 Rhythmic adjustments of pitch-accent distribution	141
7.5 Conclusion	142
<b>8 Intonation in Optimality Theory</b>	143
8.1 Introduction	143
8.2 Gen, Eval, and Con	144
8.3 OT and the tonal representation	145

	<b>Contents</b>
8.4 Positional effects	157
8.5 OT and prosodic phrasing	159
8.6 Conclusion	167
<b>9 Northern Bizkaian Basque</b>	<b>170</b>
9.1 Introduction	170
9.2 Lexical representations	171
9.3 The Accentual Phrase	172
9.4 Unaccented $\alpha$ without default H*L	175
9.5 The Intermediate Phrase	176
9.6 The construction of ip	179
9.7 Basque focus	180
9.8 Conclusion	183
<b>10 Tokyo Japanese</b>	<b>185</b>
10.1 Introduction	185
10.2 Lexical accent	186
10.3 The $\alpha$	186
10.4 The tonal structure of Utterances with one $\alpha$	187
10.5 Phonetic implementation of a one- $\alpha$ Utterance	189
10.6 An OT analysis of the tonal structure	192
10.7 More than one $\alpha$ : secondary association and interpolation	197
10.8 The Intermediate Phrase	199
10.9 The Utterance: L <sub>v</sub> and H <sub>v</sub>	201
10.10 Japanese focus	204
10.11 Conclusion	206
<b>11 Scandinavian</b>	<b>209</b>
11.1 Introduction	209
11.2 Stockholm Swedish	210
11.3 An OT analysis of Swedish tone	216
11.4 East Norwegian	217
11.5 An argument for pre-linking	222
11.6 Danish	223
11.7 Conclusion	226
<b>12 The Central Franconian Tone</b>	<b>228</b>
12.1 Introduction	228
12.2 Tonogenesis	230
12.3 The first stage	232
12.4 Improving the interrogative contrast	235
12.5 Improving the contrast in $\iota$ -final declaratives	241
12.6 Outside the focus	243

x	<b>Contents</b>
12.7 Other reinterpretations	244
12.8 Conclusion	249
<b>13 French</b>	253
13.1 Introduction	253
13.2 Prosodic phrasing	254
13.3 The tonal analysis	266
<b>14 English I: Phrasing and Accent Distribution</b>	274
14.1 Introduction	274
14.2 The distribution of pitch accents	275
14.3 Postlexical rhythm: $\phi$ -structure	278
14.4 Intonational phrases	287
14.5 Between the $\phi$ and the $\iota$	292
14.6 Conclusion	294
<b>15 English II: Tonal Structure</b>	296
15.1 Introduction	296
15.2 Nuclear contours	296
15.3 Pre-nuclear pitch accents	302
15.4 Onsets	304
15.5 Expanding the tonal grammar	305
15.6 The vocative chant	313
15.7 Tone Copy	315
15.8 Some comparisons with Pierrehumbert and Beckman's analysis	316
15.9 Conclusion	319
<i>References</i>	321
<i>Index</i>	345