# Contents

1 Introduction 1

2 Grammatical vs. lexical stress

2.1 Introduction 9
2.2 Typological grass roots 10
2.3 Grammatical stress systems 11
2.4 Lexical stress systems 13
2.5 Stress in Optimality Theory 14
2.6 Constraints for stress 18
    2.6.1 Structural constraints for metrical phonology 19
    2.6.2 Faithfulness constraints for lexical stress 21
    2.6.3 Lexical constraints for underlying stress 23
2.7 The form of overt forms 24
2.8 Summary 24

3 The learnability of hidden structure and the grammar

3.1 Introduction 25
3.2 Perception 27
3.3 Recognition and comprehension 29
3.4 Virtual production 31
    3.4.1 Virtual production from the underlying form 32
    3.4.2 Virtual production from meaning 33
3.5 Error detection 34
    3.5.1 Error detection in virtual production from the underlying form 34
    3.5.2 Error detection in virtual production from meaning 36
3.6 The reranking strategies 37
    3.6.1 Constraint Demotion 38
    3.6.2 The Gradual Learning Algorithm 40
3.7 Learning from full information 44
3.8 Summary 46

4 The learnability of grammatical stress in Latin

4.1 Introduction 47
4.2 Latin main stress 49
    4.2.1 Linguistic analyses of Latin stress 52
## Contents

4.2.2 Latin Stress in OT
- 4.2.2.1 Underlying forms 54
- 4.2.2.2 The candidate generator 54
- 4.2.2.3 The constraints 55
4.2.3 Assessment of Jacobs’ OT analysis of Latin stress 56
4.2.4 Assessment of the Tesar & Smolensky constraint set for Latin stress 63
4.2.5 Assessment of a moraic-trochee analysis of Latin stress 64
4.3 The constraint sets 70
4.4 The training data 70
4.5 The acquisition processes 74
4.6 Results 76
- 4.6.1 Informed learning of primary stress in Latin 77
- 4.6.2 Learning hidden structure and primary stress in Latin 85
- 4.6.3 Learning hidden structure including secondary stress in Latin 90
- 4.6.4 Conclusions 95
4.7 More learners, different results? 96
4.8 More learners, the same results 97
4.9 Secondary Stress in Latin?
- 4.9.1 Very weight-sensitive secondary stress 101
- 4.9.2 Weight-insensitive secondary stress in Latin? 102
- 4.9.3 Freely assignable secondary stress 103
- 4.9.4 Summary 104
4.10 Discussion 105
4.11 Conclusions 108

5 The learnability of grammatical stress and weight in Pintupi

5.1 Introduction 111
5.2 Pintupi stress 112
- 5.2.1 Pintupi stress: two possible OT accounts 113
- 5.2.2 Maintaining an analysis with TROCHAIC 119
- 5.2.3 The weight of CVC-syllables in Pintupi 120
5.3 Modelling Pintupi stress 123
- 5.3.1 Perceiving Pintupi stress 125
- 5.3.2 Virtually producing Pintupi stress 127
- 5.3.3 Learning with Constraint Demotion 128
- 5.3.4 Learning with the Gradual Learning Algorithm 130
5.4 Simulating the acquisition of Pintupi stress 131
  5.4.1 The training data 132
  5.4.2 The candidate generator 133
  5.4.3 The constraints 133
5.5 Results for Pintupi stress 135
  5.5.1 The linguist’s analysis 137
    5.5.1.1 FTNONFIN learners 137
    5.5.1.2 TROCHAIC learners 141
    5.5.1.3 Summary 143
  5.5.2 Moraic coda consonants 143
  5.5.3 Moraic coda consonants in stressed syllables only 145
  5.5.4 Final syllable extrametricality 146
  5.5.5 Moraic codas and final syllable extrametricality 148
  5.5.6 Summary 150
5.6 Generalizations to unheard forms 150
  5.6.1 Generalizations to unattested forms 151
  5.6.2 Generalizations to longer forms 152
  5.6.3 Generalizations to other stress patterns 154
5.7 The control group: learning from polysyllabic forms 155
5.8 Discussion 156
5.9 Conclusions 158

6 The learnability of grammatical and lexical stress in
Modern Greek

6.1 Introduction 159
6.2 Grammatical and lexical stress in Modern Greek 162
  6.2.1 Analyzing grammatical stress in Modern Greek 165
  6.2.2 Analyzing lexical stress in Modern Greek 166
6.3 The model for the learning of underlying forms 167
  6.3.1 Lexical constraints 169
  6.3.2 Recognition 171
  6.3.3 Virtual production 172
6.4 Testing a two-way contrast 174
  6.4.1 The training data 174
  6.4.2 The pool of underlying forms to choose from: GEN 175
  6.4.3 The constraint set 175
  6.4.4 Results: the chosen underlying forms 176
6.5 Testing a three-way contrast: learning pre- and post-stressing
  morphemes 179
Contents

6.5.1 The training data 181
6.5.2 The pool of underlying forms to choose from: GEN 181
6.5.3 The constraint set 182
6.5.4 Results: the chosen underlying forms 184
6.6 Modelling comprehension: two levels of hidden structures 187
6.6.1 The training data 187
6.6.2 The pool of underlying forms to choose from: GEN 188
6.6.3 The constraint set 189
6.6.4 Results: the chosen underlying forms 189
6.7 Alternative approaches to the learning of underlying forms 193
6.7.1 Learning underlying forms with Constraint Demotion 193
6.7.2 Lexicon Optimization 194
6.7.3 Comparison to inconsistency detection and surgery 196
6.7.4 Considering multiple grammars 196
6.7.5 A note on Richness of the Base 197
6.8 Discussion 198

7 Conclusions
7.1 Learning hidden structures 201
7.2 Why there can be different grammars for the speakers of the same language 203
7.3 The innateness of constraints 204
7.4 Constraint Demotion vs. the Gradual Learning Algorithm 204
7.5 The logical problem of language acquisition 205
7.6 Future research 206

References 209

Samenvatting 219

Curriculum Vitae 221