

The Structure of Spoken Language

Intonation in Romance

Philippe Martin



CAMBRIDGE
UNIVERSITY PRESS

Contents

<i>List of figures and maps</i>	<i>page</i> x
<i>List of tables</i>	xix
<i>Preface</i>	xxi
<i>Acknowledgments</i>	xxv
<i>Key concepts</i>	xxvii
1 Introduction	1
The respiratory cycle	1
The source-filter model of phonation	3
Emotions	5
Voiced and unvoiced speech sounds	7
Laryngeal frequency	7
Fundamental frequency and melodic curve	7
Intensity	9
Spectrographic analysis	9
Syllabic duration	10
Syntax and prosody	11
The prosodic structure: the structure of spoken language	13
Stressed syllables	13
Intonation and syntax	14
Brain waves and prosody	14
A Copernican change	15
From laboratory to spontaneous speech	16
Reading and listening	16
Romance languages	17
2 The role of technological advances	20
The kymograph	20
The spectrograph	21
Fundamental frequency tracking	23
First results	23
Electroencephalography and brain waves	27
Transcription and alignment of speech	27
3 Transcription systems	29
Acoustic and perceived data	30

Obtaining data: pitch curves	30
Selecting data	32
Historical background	32
The AMPER project	36
The Prosogram	36
ToBI	38
INTSINT and Momel	40
Analog	41
Transcription as theory	42
Perception and interpretation	43
A phonological transcription system	44
4 The Autosegmental-Metrical Prosodic Structure	46
A brief description	46
Properties	48
Applying the concept	51
Questions and remarks	54
The prosodic structure revisited	56
5 The Incremental Prosodic Structure	59
Melodic curves	59
The stress group	61
The prosodic word	62
Syllabic chunking	63
The time dimension	64
Conversion of syllabic chunks	65
The syllable in the stress group	66
The stress group in the sentence	68
Classes of conclusive contours	68
Basic modalities	68
Modality variants	69
Alternative questions	71
Iconicity of conclusive contours	71
Imperative contour	73
Implicative contour	73
Contour of surprise	74
Contour of doubt	75
The Incremental Prosodic Structure	76
Independence	79
Prosodic events	79
Properties	81
Prosodic phrasing	82
Planarity	83
Connexity	83
Domain	84
Neutralization	85
Differentiation in the time domain	85
Differentiation of prosodic events	86
The dynamic prosodic structure	87

The Incremental Storage-Concatenation process	88
Preplanning	90
Melodic contours features	90
One prosodic word	91
Two prosodic words	92
Three prosodic words ended with C0	92
Contrast of melodic slope	94
Three prosodic words ended with C1	94
Prosodic structure constraints	96
The <i>arc accentuel</i> in French	96
Stress clash	97
Minimum duration of prosodic words	98
Maximum duration of prosodic words	99
Eurhythmy	101
Word alignment	104
Syntactic clash	105
Experimental data	106
Brain waves and prosodic structure	107
Theta brain waves and the perception of syllables	107
Delta brain waves and stressed syllables	108
Delta brain waves frequency range	110
Prosodic structure constraints and brain waves	111
Stress groups and brain waves	113
Constraints revisited	113
Sequential sentence structuration by prosody and syntax	115
A simple example: telephone numbers	116
6 Lexical stress in Romance languages	120
Stress and accent	120
Stress in various languages	121
Stressed syllables in Latin	122
Stressed syllables in Romance languages (other than French)	123
Orthographic convention and homographs	124
Rules for word stress placement	126
A statistical approach	127
A phonological-phonetic approach	127
A phonological approach	128
A morphophonetic approach	128
A morphological approach	128
French	130
Secondary accent and <i>arc accentuel</i>	131
The <i>groupe de sens...</i>	131
Stress variations in Romance languages	132
7 The Incremental Prosodic Structure in six Romance languages	133
EuRom4 and EuRom5	134
The process of reading	135
Note on figures	136
The Incremental Storage-Concatenation process	136
The melodic contours of Romance languages	137

Inventory	138
Processing prosodic information	141
Prosodic structures in Romance languages	144
Identification of prosodic contours	144
Complex contour	146
Experimental data	148
Sequences of two prosodic words	150
Sequences of three prosodic words	160
Sequences of four prosodic words and more	185
Coordination, enumeration, parenthesis	192
Coordination	192
Enumeration	198
Parenthesis	200
An example of AM prosodic analysis in French	203
An example of ISC prosodic processing in French	208
Conclusion	212
8 Macrosyntax	214
A first approach	215
Three current models for macrosyntax	217
The theory of <i>la lingua in atto</i>	220
Text macrosyntax and prosodic macrosyntax	221
Merging text and intonation	222
Dysfluencies	224
Ponctuants	225
The prosodic eraser	226
Use of dysfluencies	226
Deletions	227
Additions	228
Text and prosodic macrosegments	230
Examples of macrosyntactic analysis	232
French	233
Italian	241
Portuguese	245
Conclusion	248
9 Applications	249
Teaching French prosodic structure	249
Silent reading	252
Eye movement	253
Subvocalization	253
Delta wave synchronization	255
10 Conclusion	256
Quotes from Frédéric Dard (San Antonio)	256
11 WinPitch	259
Sound recording made clear	259
Sound and video	260
Transcription and alignment on the fly	261

Contents

ix

Data mining for large speech corpora	262
Acoustic analysis	266
Prosodic morphing	270
Automatic segmentation	270
Interface with other software	270
<i>References</i>	272
<i>Analyzed corpora</i>	285
<i>Author index</i>	287
<i>Subject index</i>	290