

# Contents

<b>Section I</b>	<b>The Neuropsychology of Language and Communication</b>	<b>1</b>
<b>1</b>	<b>Biological Basis of Linguistic and Communicative Systems: From Neurolinguistics to Neuropragmatics</b>	<b>3</b>
	Michela Balconi	
1.1	Introduction: Neuropsychology for Language and Communication	3
1.2	Properties and Functions of Linguistic and Communicative Processes	5
1.3	Anatomic-structural Models of Language Functioning	7
1.3.1	Classical Models	7
1.3.2	Recent Acquisitions: Sub-cortical Systems and Interface Areas	10
1.4	The Contribution of Neurolinguistics	11
1.4.1	Language Production and Comprehension Processes: Cognitive Models	11
1.4.2	Functional Modularity of Language and Independence of Conceptual, Syntactic, and Semantic Representation Systems	13
1.5	Neuropsychology of Superior Communicative Functions: Neuropragmatics	15
1.5.1	Paralinguistic Components	16
1.5.2	Indirect Speech Acts and Pragmatic Functions of Figurative Language	19
1.6	Discourse Neuropragmatics	20
1.6.1	Discourse Competences: the Kintsch and van Dijk Model	20
1.7	Conversational Functions	21
	References	22

<b>2</b>	<b>Methods and Research Perspectives on the Neuropsychology of Communication</b> . . . . .	29
	Michela Balconi	
2.1	Introduction . . . . .	29
2.2	Assumptions of Cognitive Neuropsychology . . . . .	29
2.2.1	Function-structure Relationship . . . . .	29
2.2.2	Structural, Functional and Representational Modularity . . . . .	30
2.3	Methods of Analysis in Cognitive Neuropsychology . . . . .	31
2.3.1	Experimental and Clinical Methods . . . . .	31
2.4	Neuropsychological Measures for Language and Communication . . . . .	32
2.4.1	Neuropsychological Assessment and Psychometric Batteries . . . . .	32
2.4.2	Observational Indexes . . . . .	33
2.4.3	Psychophysiological Indexes: Neurovegetative Measures . . . . .	36
2.4.4	Cortical Electrical Activity . . . . .	37
2.4.5	Neuroimaging: Structural and Functional Techniques . . . . .	40
	References . . . . .	43
<b>3</b>	<b>Transcranial Magnetic Stimulation in the Study of Language and Communication</b> . . . . .	47
	Carlo Miniussi, Maria Cotelli, Rosa Manenti	
3.1	Introduction . . . . .	47
3.2	TMS and Language Studies . . . . .	49
3.2.1	Production . . . . .	49
3.2.2	Comprehension . . . . .	53
3.3	Motor Area and Language . . . . .	55
3.4	Conclusions . . . . .	56
	References . . . . .	57
<b>4</b>	<b>Electromagnetic Indices of Language Processings</b> . . . . .	61
	Alice Mado Proverbio, Alberto Zani	
4.1	Models of Language Comprehension and Production . . . . .	61
4.2	Electrophysiology of Language . . . . .	63
4.3	Orthographic Analysis . . . . .	66
4.4	Phonologic/Phonetic Analysis . . . . .	68
4.5	Grapheme-to-phoneme Conversion in Reading Deficits (Dyslexia) . . . . .	72
4.6	Lexical Analysis . . . . .	76
4.7	Pragmatic Analysis . . . . .	79
4.8	First- and Second-level Syntactic Analysis . . . . .	81
4.9	The Representation of Language(s) in the Multilingual Brain: Interpreters and Bilinguals . . . . .	82
	References . . . . .	87

<b>Section II</b>	<b>Neuropragmatics. Psychophysiological, Neuropsychological and Cognitive Correlates</b>	91
<b>5</b>	<b>From Pragmatics to Neuropragmatics</b>	93
	Michela Balconi, Simona Amenta	
5.1	Communication and Pragmatics	93
5.1.1	“Pragmatic Meaning” and the Semantics/Pragmatics Interface	94
5.2	Pragmatic Issues	95
5.2.1	The Origins of Pragmatic Perspective	95
5.2.2	Pragmatic Competence as Communicative “Strategy” and “Option”	95
5.2.3	Pragmatics, Comprehension and Inference	96
5.2.4	Pragmatics and Context: Salience and the Direct Access View	97
5.3	Neuropragmatics	98
5.3.1	The Neuropragmatic Perspective	98
5.3.2	Neuropragmatic Issues	99
5.4	Irony Elaboration: Definition, Models and Empirical Evidence	99
5.4.1	Models of Irony Understanding	101
5.4.2	Irony Comprehension: Empirical Contributions	102
	References	106
<b>6</b>	<b>Idiomatic Language Comprehension: Neuropsychological Evidence</b>	111
	Costanza Papagno	
6.1	Introduction	111
6.2	Experimental Paradigms	113
6.3	Idiom Comprehension in Patients with Focal Brain Lesions	113
6.3.1	Idiom Comprehension in Right-brain-damaged Patients	113
6.3.2	Idiom Comprehension in Aphasic Patients	116
6.3.3	Idiom Comprehension and the Prefrontal Lobe	121
6.3.4	Idiom Comprehension and the Corpus Callosum	122
6.4	Idiom Comprehension in Patients with Alzheimer’s Disease	123
6.5	Idiom Comprehension in Schizophrenic Patients	125
6.6	Conclusions	126
	References	127
<b>7</b>	<b>Anticipatory Mechanisms in Idiom Comprehension: Psycholinguistic and Electrophysiological Evidence</b>	131
	Paolo Canal, Francesco Vespignani, Nicola Molinaro, Cristina Cacciari	
7.1	Introduction	131
7.2	What an Idiomatic Expression Is (and Is Not)	132
7.3	Semantic Forward-looking Mechanisms in Idiom Comprehension	133

7.4	An ERP Study on the Comprehension of Idiomatic Expressions in Italian: The N400 and the Electrophysiological Correlate of Categorical Expectations .....	138
7.5	Conclusions .....	142
	References .....	142
<b>8</b>	<b>Towards a Neurophysiology of Language .....</b>	<b>145</b>
	Stefano F. Cappa	
8.1	Introduction .....	145
8.2	The Neurobiology of Syntax .....	146
8.3	Semantic Representations in the Brain .....	148
8.4	Multiple Pathways for Language Processing .....	151
8.5	Conclusions .....	152
	References .....	153
<b>Section III</b>	<b>From Intentions to Nonverbal Communication .....</b>	<b>157</b>
<b>9</b>	<b>Intentions and Communication: Cognitive Strategies, Metacognition and Social Cognition .....</b>	<b>159</b>
	Michela Balconi	
9.1	Introduction: Communication as an Intentionalization Process .....	159
9.1.1	Intentionality and Communicative Intention .....	160
9.1.2	Intention and Consciousness .....	160
9.1.3	Consciousness and Attention: Two Autonomous Systems .....	161
9.1.4	Consciousness Functions for Communication .....	162
9.2	Planning and Control of Communicative Action .....	164
9.2.1	Executive Functions .....	164
9.2.2	Executive Functions for Intentional Communication .....	165
9.2.3	Working Memory Contribution .....	166
9.3	Action Strategies for Communication .....	167
9.3.1	Action Hierarchy Model .....	167
9.3.2	Strategy Implementation .....	168
9.3.3	Self-monitoring and Meta-cognition .....	170
9.4	The Contribution of Social Neuroscience to Communication .....	170
9.4.1	Models of the Mental States of Others .....	171
9.4.2	Meta-cognition and Conversation Regulation .....	172
	References .....	173

<b>10 The Neuropsychology of Nonverbal Communication:</b>	
<b>The Facial Expressions of Emotions</b> .....	177
Michela Balconi	
10.1 Introduction .....	177
10.2 Facial Expressions: Discrete Categories or Dimensions? .....	178
10.2.1 What About Intention Attribution? .....	179
10.2.2 Facial Expressions as Social Signals .....	180
10.2.3 Facial Expressions of Emotion as Cognitive Functions .....	181
10.2.4 The Stage Processing Model .....	182
10.2.5 Structural and Semantic Mechanisms of Emotional Facial Processing. Empirical Evidence .....	185
10.3 Neuropsychological Correlates of Emotional Facial Processing .....	187
10.3.1 Regional Brain Support for Face-specific-processing? .....	188
10.3.2 The Role of the Frontal and Temporal Lobes and of the Limbic Circuit in Emotion Decoding .....	189
10.4 Left and Right Hemispheres in Facial Comprehension .....	192
10.4.1 Asymmetry of Emotional Processing .....	193
10.5 The Universe of Emotions: Different Brain Networks for Different Emotions? .....	195
10.5.1 Emotional Valence and the Arousal of Facial Expressions .....	195
10.5.2 N200 ERP Effect in Emotional Face Decoding .....	196
References .....	198
<b>11 Emotions, Attitudes and Personality: Psychophysiological Correlates</b> ....	203
Michela Balconi	
11.1 Introduction .....	203
11.2 Facial Expression of Emotions as an Integrated Symbolic Message .....	204
11.3 Developmental Issues: Dimensionality in the Child's Emotional Face Acquisition .....	204
11.4 The Effect of Personality and Attitudes on Face Comprehension ....	206
11.4.1 Appetitive vs Defensive Systems and the BIS and BAS Measures .....	207
11.4.2 New Directions: EEG Brain Oscillations and ERPs .....	208
11.5 Specialization of the Right Hemisphere in Facial Expressions? .....	211
11.5.1 Lateralization Effect and Valence .....	212
11.5.2 Emotional Type Effect Explained by the "Functional Model" .....	213
11.5.3 Recent Empirical Evidences: Frequency Band Analysis and BIS/BAS .....	214
References .....	216
<b>Subject Index</b> .....	221

## List of Contributors

**Simona Amenta**

Department of Psychology  
Catholic University of Milan  
Milan, Italy

**Michela Balconi**

Department of Psychology  
Catholic University of Milan  
Milan, Italy

**Cristina Cacciari**

Department of Biomedical Sciences  
University of Modena and Reggio Emilia  
Modena, Italy

**Paolo Canal**

Department of Biomedical Sciences  
University of Modena and Reggio Emilia  
Modena, Italy

**Stefano F. Cappa**

Vita-Salute San Raffaele University  
and Division of Neuroscience  
San Raffaele Scientific Institute  
Milan, Italy

**Maria Cotelli**

Cognitive Neuroscience Section  
IRCCS San Giovanni di Dio Fatebenefratelli  
Brescia, Italy

**Alice Mado Proverbio**

Department of Psychology  
University of Milano-Bicocca  
Milan, Italy

**Rosa Manenti**

Cognitive Neuroscience Section  
IRCCS San Giovanni di Dio  
Fatebenefratelli  
Brescia, Italy

**Carlo Miniussi**

Department of Biomedical Sciences  
and Biotechnologies  
National Institute of Neuroscience  
University of Brescia  
Brescia, Italy  
Cognitive Neuroscience Section  
IRCCS San Giovanni di Dio Fatebenefratelli  
Brescia, Italy

**Nicola Molinaro**

Basque Center on Cognition,  
Brain and Language  
Donostia-San Sebastián, Spain

**Costanza Papagno**

Department of Psychology  
University of Milano-Bicocca  
Milan, Italy