## CONTENTS

Lis	t of figures xii				
	t of tables xix				
	Preface xx				
-	knowledgments xxiii				
10,	4.2 Research Strands within Visual World Eng Tracking 91.				
	4.2.1 Word Recognition 99				
1	Introducing Eye Tracking 1				
	1.1 Online Methodologies in Language Processing Research 2				
	1.1.1 Think-Aloud Protocols 2				
	1.1.2 Self-Paced Reading 6				
	1.1.3 Eye Tracking 10				
	1.1.4 Event-Related Potentials 13				
	1.1.5 Synthesis 17				
	1.2 Why Study Eye Movements? 19				
	1.3 Summary 23				
	Notes 23				
2	What Do I Need to Know about Eye Movements? 24				
	2.1 The Observer and the Visual Field 24				
	2.2 Types of Eye Movements 30				
	2.3 The Perceptual Span 38				
	2.4 Where the Eyes Move 43				
	2.5 When the Eyes Move 46				
	270 112010 10				

	2.6 How Tight Is the Eye-Mind Link? A Look at Iwo Models of Eye-Movement Control 51  2.7 Conclusion 57	
	Notes 59	
	1votes 39	
3	What Topics Can Be Studied Using Text-Based Eye	51
	Tracking. It by the care to the tracking to the care t	, 1
	3.1 Finding a Research Topic 61	
	3.2 Research Strands within Text-Based Eye Tracking 63	
	3.2.1 Grammar 65	
	3.2.2 Vocabulary and the Bilingual Lexicon 71	
	3.2.3 Instructed Second Language Acquisition 77 3.2.4 Subtitles 80	
	3.2.5 Assessment 82 3.3 Conclusion 86	
	Notes 86	
4	What Topics Can Be Studied Using the Visual World	
717		38
	4.1 Foundations of the Visual World Paradigm 88	
	4.2 Research Strands within Visual World Eye Tracking 97	
	4.2.1 Word Recognition 99	
	4.2.2 Prediction 103	
	4.2.2.1 What is Prediction? 103	
	4.2.2.2 Semantic Prediction 107	
	4.2.2.3 Morphosyntactic Prediction 108	
	4.2.2.4 Prediction Using Multiple Cues 112	
	4.2.2.5 Effects of Instruction 113	
	4.2.3 Referential Processing 116	
	4.2.4 Production 120	
	4.3 Conclusion 123	
	Notes 125	
5	General Principles of Experimental Design	26
3	5.1 Doublets, Triplets, and Quadruplets 126	
	5.2 Between- and Within-Subjects Designs 134	
	5.3 Trials: Practice Trials, Critical Trials, and Filler Trials 138	
	5.4 Primary Tasks and Secondary Tasks 142	
	5.5 How Many Items Do I Need? 151	
	5.6 Conclusion 156	
	Notes 157	

6	Des	igning an Eye-Tracking Study	158			
0	C					
	0.1	Defining Areas of Interest 158 6.1.1 Word-Based Interest Areas 159				
		6.1.2 Larger Areas of Text 162				
		6.1.3 Image-Based Interest Areas 163				
		6.1.3.1 Images in Text-Based Research 163				
		6.1.3.2 Images in the Visual World Paradigm 165				
		6.1.4 Setting Interest Areas in Your Own Research 171				
	6.2	Guidelines for Text-Based Eye-Tracking Research 171				
		6.2.1 Spatial Constraints 171				
		6.2.2 Artistic Factors 174				
		6.2.3 Linguistic Constraints 177				
		6.2.3.1 Experimental and statistical control 178				
	6.3	Visual World Research 181				
		6.3.1 Selecting Images 182				
		6.3.1.1 Experimental Design 182				
		6.3.1.2 Visual Properties of Images 186				
		6.3.1.3 Naming Consistency and Normed Databases 188				
		6.3.1.4 Should I Have a Preview? 191				
		6.3.1.5 Should my Experiment Have a				
		Fixation Cross? 193				
		6.3.2 Preparing Audio Materials 196				
		6.3.2.1 Creating Audio Materials 196				
		6.3.2.2 Defining Time Periods 198				
	6.4	Conclusion 202				
	Notes 203					
7	Eye-	-Tracking Measures	205			
	7.1	Eye-Tracking Measures in Text-Based and Visual				
		World Research 206				
	7.2	Eye-Movement Measures 210				
		7.2.1 Fixations and Skips 210				
		7.2.1.1 Counts, Probabilities, and Proportions 210				
		7.2.1.2 Fixation Duration 214				
		7.2.1.3 Fixation Latency 229				
		7.2.1.4 Fixation Location 231				
		7.2.2 Regressions 232				
		7.2.3 Integrated Eye-Tracking Measures 237				
		7.2.3.1 Heatmaps, Luminance Maps, and Gaze Plots 237				
		7.2.3.2 Scanpaths 242				
	7.3	Conclusion: What Measures Should I Use? 247				
		es 250				

8 Data Cleaning and Analysis

	8.1 Data	Cleaning 251	
	8.1.	1 Data Cleaning Software 252	
		2 Inspecting Individual Participant Records and Trials 253	
	8.1.	3 Correcting for Drift 257	
	8.2 Deal	ing with Outliers 260	
	8.2.	1 Dealing with Overly Short and Long Fixations 261	
	8.2.	2 Data Transformation 263	
	8.2.	3 Accounting for Outliers: Model Criticism or Aggressive	
		A Priori Screening? 265	
	8.3 Over	rview of Statistical Practices in Current	
		Tracking Research 271	
	_	ar Mixed-Effects Models 275	
		1 What's Wrong with Repeated-Measures ANOVA? 275	
	8.4.	2 Introducing Linear Mixed-Effects Models 276	
	8.4.	3 Data-driven Versus Top-Down Approaches to Selecting	
		a Random Effects Structure 278	
	8.4.	4 Worked Example 281	
	8.4.	5 Reporting the Results 286	
	8.5 Ana	lyzing Time-Course Data 287	
	8.5.	1 Analyzing Separate Time Windows 288	
	8.5.	2 Growth Curve Analysis 288	
		8.5.2.1 Data Preprocessing 288	
		8.5.2.2 Data Visualization 291	
		8.5.2.3 Logistic or Quasi-Logistic Regression 296	
		8.5.2.4 Choosing Time Terms 299	
		8.5.2.5 Worked Example 302	
		8.5.2.6 Reporting the Results 306	
		clusion: Which Analysis Should I Use? 307	
	Notes 30	09	
	4.3 Cur	turns 1.3	211
9		ip an Eye-Tracking Lab	311
		osing an Eye Tracker 311	
		1 Types of Eye Trackers and Their Precursors 311	
		2 Video-Based Eye Trackers 316	
	9.1.	3 How Does an Eye Tracker Work? Speed, Accuracy, and	
	007	Precision 322	
		Eye-Tracking Lab 330	
		1 Practical Considerations 330	
		2 Spatial and Technical Requirements for a Lab 334	
	9.2.	3 Managing an Eye-Tracking Lab 336	

251

9.3 Getting	g Started	338
9.3.1	Ideas for	Research 338
	9.3.1.1	Research Idea 1: Entry-Level: Create a
		Sentence-Processing Experiment 338
	9.3.1.2	Research Idea 2: Entry-Level: Create a
		Text Reading Study 339
	9.3.1.3	Research Idea 3: Entry-Level: Study Script
		Effects in Reading 341
	9.3.1.4	Research Idea 4: Entry-Level: Create a Visual
		World Study 343
	9.3.1.5	Research Idea 5: Intermediate: Replicate a L1
		Reading Study with L2 Readers 345
	9.3.1.6	Research Idea 6: Intermediate: Replicate a L1 Visual World
		Study with L2 Listeners or Bilinguals 347
	9.3.1.7	Research Idea 7: Intermediate: Conduct an
		Interaction Study 348
	9.3.1.8	Research Idea 8: Advanced: Examine L2 Listening as a
		Multimodal Process 349
	9.3.1.9	Research Idea 9: Advanced: Study Cognitive Processes dur-
		ing Intentional Vocabulary Learnings 351
	9.3.1.10	Research Idea 10: Advanced: Conduct a Synchronous
		Computer Mediated Communication (SCMC) Study with
		Eye Tracking 353
9.3.2	Tips for I	Beginners 355
		About the Equipment 355
	9.3.2.2	About Data Collection 356
	9.3.2.3 2	About Data Analysis 361
Notes 363		
D.C.		of pull residence in the state leave and a second state leave a second s
References		or problems while leave the black have 364
Index of Names		401
Index		diametra a consider minimum lo quintonista. 406