

CONTENTS

	<i>page</i>
<i>List of illustrations</i>	vii
<i>List of tables</i>	xi
<i>Preface</i>	xiii
<i>Acknowledgements</i>	xvii
<i>List of abbreviations</i>	xix
PART I Elements of psycholinguistics	
1 Characteristics of the language signal	3
1.1 Introduction	3
1.2 The speech signal	9
1.3 Writing systems	23
1.4 Conclusions	45
2 The biological foundations of language	48
2.1 Introduction	48
2.2 The auditory system	52
2.3 The visual system	64
2.4 The organisation of language in the brain	73
2.5 The articulatory and manual systems	85
2.6 Conclusions	104
3 Sources of evidence for the language system	109
3.1 Introduction	109
3.2 Non-fluencies	119
3.3 Grammatical characterisation	133
3.4 Errors	151
3.5 Conclusions	171
PART II Processes and models	
4 Processing the language signal	181

4.1	Introduction	181
4.2	Perceiving the speech signal	183
4.3	Perceiving the graphic signal	208
4.4	Articulatory processes	217
4.5	Written language production	229
4.6	Conclusions	236
5	Accessing the mental lexicon	239
5.1	Introduction	239
5.2	Interpreting the findings	246
5.3	A search model of lexical access	266
5.4	Word-detector systems: the logogen model	276
5.5	Word-detector systems: the cohort model	286
5.6	Further issues	290
5.7	Conclusions	298
6	Understanding utterances	301
6.1	Introduction	301
6.2	Serial models	320
6.3	Parallel models	332
6.4	Interpretative processes	355
7	Producing utterances	370
7.1	Introduction	370
7.2	The internal structure of the message level	377
7.3	Lexical access: the nature of stored word-meanings	388
7.4	The internal structure of the sentence level	391
7.5	Serial versus parallel interpretations	403
7.6	Conclusions	413
8	Impairment of processing	416
8.1	Introduction	416
8.2	The main aphasic syndromes	426
8.3	The validation of aphasic syndromes	445
8.4	The interpretation of aphasic syndromes	453
8.5	Conclusion	467
	<i>References</i>	472
	<i>Index of names</i>	500
	<i>Subject index</i>	506

ILLUSTRATIONS

	<i>page</i>
1.1 The 'speech chain'	4
1.2 The 'language switchboard'	5
1.3 Lateral cine-fluorographic record of continuous speech	10
1.4 Computer printout of electropalatographic record	13
1.5 Spectrographic representation of the phrase <i>rapid writing</i>	20
1.6 Schematic three-dimensional diagram of spectrographic form	21
1.7 A standard warning sign from the British Highway Code	25
1.8 A generalised typology of writing systems	26
1.9 Possible points of contact with units of writing systems	27
1.10 Japanese and Kannada symbols with English equivalents	33
1.11 The character inventory of a standard English typewriter	35
1.12 Examples of letter-to-sound relationships in English	39
1.13 Regular spelling-to-sound correspondence in English	43
2.1 Principal structures of the brain	51
2.2 Schematic diagram of the outer-, middle- and inner-ear systems	53
2.3 Schematic representation of basilar membrane characteristics	55
2.4 Mechanico-neural transduction through the cochlea	57
2.5 Schematic 'tuning curve' of a typical auditory nerve cell	59
2.6 Diagram of inputs from right ear through the auditory system	61
2.7 Elements of the visual system	65
2.8 Schematic view of a portion of the retina	68
2.9 The left cerebral hemisphere, showing major landmarks	75
2.10 Regional cerebral blood-flow pattern in listening to speech	80
2.11 Summary of outcomes from inputs to 'split-brain' subjects	84
2.12 Motor control of speech and writing	87
2.13 The lower motor neuron system	91

2.14	Diagram of air passages in the adult human and chimpanzee	95
2.15	The vocal tract as a device for producing local pressure changes	96
2.16	Breathing for speech	98
2.17	The relationship between channel area and volume-velocity	103
2.18	Binet's nineteenth-century recording of the dynamics of handwriting	105
3.1	Illustrative sample of conversational English	114
3.2	Naturally displayed evidence in spoken-language production	117
3.3	Non-fluency in eleven defined positions in utterances	123
3.4	Cumulative plot of non-fluencies and pause words	125
3.5	Patterns of pause distribution within the utterance	128
3.6	Temporal measure of 'encoding cycles'	131
3.7	Generalised syllable structure for English words	156
3.8	Possible feature-based handwriting errors	165
3.9	Schematic illustration of serial and parallel processing	174
3.10	Relationships between orders of description in language processing	176
4.1	The components of language processing	182
4.2	Spectrogram of the phrase <i>rapid writing</i>	187
4.3	Formant positions for some steady-state English vowel sounds	194
4.4	Synthetic speech stimuli formant patterns for /ba-/da-/ga/	196
4.5	Synthetic speech stimuli formant patterns for /be-/we-/ue/	196
4.6	Synthetic speech formant patterns for /d/	197
4.7	Synthetic speech stimuli formant patterns for /ra-/la/	197
4.8	Hypothetical sensitivity functions for detectors sensitive to VOT	202
4.9	Handwritten production of the phrase <i>rapid writing</i>	214
4.10	Schematic diagram of Shattuck-Hufnagel's scan-copier model	219
4.11	Upper components of the sensory goal model of speech production	221
4.12	Lower components of the sensory goal model of speech production	224
4.13	The production of a feature-based slip of the pen	231

4.14	Possible organisation of the buffer store in writing output	231
5.1	General framework of relationships inside and outside the lexicon	249
5.2	Word recognition as a function of length and letter legibility	252
5.3	The configuration of a dictionary search for the word <i>rapid</i>	261
5.4	A transition-network representation of dictionary entries	263
5.5	The search model of lexical access	268
5.6	Lexical and non-lexical routes in visual word recognition	272
5.7	Morphological analysis in word recognition	275
5.8	Contrasts for affix effects in lexical access	276
5.9	The main components and relationships of the logogen model	278
5.10	Modality-specific independences within the logogen system	282
5.11	The later version of the logogen model	283
5.12	The later version of the logogen model with non-lexical routes	284
6.1	Sources of input to the processes of understanding	307
6.2	A schematic illustration of distributed memory	311
6.3	The linguistic grammar, parsing procedures and the mental grammar	313
6.4	A simple type of two-stage parser	321
6.5	The internal cue structure of Functionally Complete Units	332
6.6	A simple transition network	343
6.7	A simple recursive transition network (RTN)	344
6.8	A word-class RTN	346
6.9	Sample transition networks	348
6.10	Illustration of a chart structure in parsing	354
7.1	Euler circle and Venn diagram representation of a syllogism	379
7.2	TOTE-units (a) simple, (b) hierarchical	382
7.3	Mental model, image and propositional representation of meaning	387
7.4	Two feature specifications of 'husband'	389
7.5	The message and sentence levels in the Garrett model	394
7.6	A verb-based positional frame fragment	395
7.7	Schematic diagram of the syntactic processor	397
7.8	Word outcomes in initial consonant errors and chance estimates	407
7.9	Phonological similarity in word-substitution errors and blends	409

7.10	Phonological similarity in semantic and other substitution errors	410
7.11	Phonological similarity in misordering errors	411
7.12	A network for the semantic and form properties of words	414
8.1	Lateral and coronal section views of damage to Broca's area	422
8.2	Visual-field defects associated with certain lesion sites	424
8.3	Lateral view of the areas served by the three main cerebral arteries	425
8.4	Incidence of aphasic syndromes in 150 aphasics	427
8.5	Level of functioning by aphasic syndrome	427
8.6	Typical lesion sites for aphasic syndromes	428
8.7	Hypothesised location of processing impairments in anomia	430
8.8	Cluster analysis for 142 aphasics with infarcts, on the WAB	449
8.9	Spoken and written language abilities on the WAB, for sixty-four aphasics	452
8.10	The encodability of inflectional morphemes in agrammatism	457
8.11	Grammatical and phonological elements in Broca's speech	458

TABLES

	<i>page</i>
1.1 Some input-output relations	6
1.2 Three categories of upper- to lower-case letter relations	37
3.1 Categories of preceding context for forty-two non-fluencies	120
3.2 'Same' (S) and 'reconstructed' (R) continuations	121
3.3 Distributional measures for ten word classes	139
3.4 Exponents of clause-level V	143
3.5 Exponents of noun phrases	144
3.6 Incidence of clause-level elements and patterns	146
3.7 Incidence of various types of connectivity features	148
3.8 Structural properties of slips of the ear	163
3.9 Taxonomy of slips of the eye	168
4.1 Hypothesised speech cues in the acoustic signal	192
5.1 Input and output types in lexical access	247
5.2 Mean recognition latencies for letters and words	252
5.3 Word-non-word decision latency as a function of string type	253
6.1 Serial and parallel predictions for the target-monitoring tasks	336
6.2 Mean response latencies for the monitoring tasks	336
6.3 Revised predictions for the target-monitoring tasks	338
6.4 Mean response latencies for the monitoring tasks, new data	339
6.5 Mean response latencies for the monitoring tasks (two sentences)	342
7.1 Comparison of the Goldman-Eisler and Fromkin models	374
7.2 A 'tableau' representation of a syllogism	384
7.3 Constraints on exchange movement errors	393
7.4 A partial V-fragment store for English	396
7.5 Levels and processes involved in major lexical-class errors	400
7.6 The framework for the analysis of exchange errors	405
7.7 Calculating chance expectations for lexical bias	406

8.1	Some commonly tested psycholinguistic abilities	419
8.2	Major types of cerebral damage	419
8.3	The comparative symptomatology of the main aphasic syndromes	428
8.4	The comparative symptomatology of alexia and agraphia	444
8.5	Scoring items on the Western Aphasia Battery	446
8.6	Fluency scoring on the Western Aphasia Battery	447
8.7	Cluster analysis for aphasics with infarcts	450
8.8	Characteristics of surface and deep dyslexia	454
8.9	The noun types in a normal adult and an aphasic	462
8.10	The symptoms of dyspraxia	465