

# COGNITIVE PSYCHOLOGY

PHILIP QUINLAN & BEN DYSON



PEARSON

Prentice  
Hall

Harlow, England • London • New York • Boston • San Francisco • Toronto • Sydney • Singapore • Hong Kong  
Tokyo • Seoul • Taipei • New Delhi • Cape Town • Madrid • Mexico City • Amsterdam • Munich • Paris • Milan

# Brief contents

<i>List of figures and tables</i>	<i>xxiv</i>
<i>Guided tour</i>	<i>xxx</i>
<i>Preface</i>	<i>xxxv</i>
<i>Acknowledgements</i>	<i>xxxvii</i>
<i>About the authors</i>	<i>xxxviii</i>
<b>Chapter 1 Foundations</b>	<b>1</b>
<b>Chapter 2 Information processing and nature of the mind</b>	<b>31</b>
<b>Chapter 3 Visual processes and visual sensory memory</b>	<b>64</b>
<b>Chapter 4 Masking, thresholds and consciousness</b>	<b>105</b>
<b>Chapter 5 An introduction to perception</b>	<b>143</b>
<b>Chapter 6 Theories of perception</b>	<b>185</b>
<b>Chapter 7 Mental representation</b>	<b>228</b>
<b>Chapter 8 Attention: general introduction, basic models and data</b>	<b>271</b>
<b>Chapter 9 Attentional constraints and performance limitations</b>	<b>312</b>
<b>Chapter 10 Human memory: an introduction</b>	<b>342</b>
<b>Chapter 11 Human memory: fallibilities and failures</b>	<b>387</b>
<b>Chapter 12 Semantic memory and concepts</b>	<b>416</b>
<b>Chapter 13 Object recognition</b>	<b>464</b>
<b>Chapter 14 The nature of language and its relation to the other mental faculties</b>	<b>509</b>
<b>Chapter 15 Reasoning</b>	<b>557</b>
<b>Chapter 16 Cognition and emotion</b>	<b>600</b>
<i>Bibliography</i>	<i>641</i>
<i>Glossary</i>	<i>665</i>
<i>Name index</i>	<i>681</i>
<i>Subject index</i>	<i>688</i>
<i>Publisher's acknowledgements</i>	<i>699</i>

# Contents

<i>List of figures and tables</i>	xxiv
<i>Guided tour</i>	xxx
<i>Preface</i>	xxxv
<i>Acknowledgements</i>	xxxvii
<i>About the authors</i>	xxxviii

## Chapter 1 Foundations

1

<i>Learning objectives</i>	1
<i>Chapter contents</i>	1
<i>'If you don't believe, she won't come': Playground hypothesising about the tooth fairy</i>	2
<i>Reflective questions</i>	3
<b>Part 1: An historical perspective and why there is more to cognitive psychology than meets the eye</b>	<b>3</b>
<b>Introduction and preliminary considerations</b>	<b>3</b>
<b>The abstract nature of cognitive psychology</b>	<b>4</b>
<b>Dualism and one of the many mind/body problems</b>	<b>5</b>
<b>Behaviourism</b>	<b>6</b>
The laws of behaviour	6
The principles of associationism	7
Associative processes and learning about causation	8
<b>Some general points about behaviourism</b>	<b>8</b>
Research focus 1.1: <i>Are you looking at me? The role of race when fear stares you in the face</i>	9
Methodological behaviourism	10
Behaviourism and free will	10
Behaviourism and the science of psychology	11
Logical behaviourism	11
Criticisms of logical behaviourism	12
<b>'Testability is falsifiability': cognitive psychology and theory testing</b>	<b>13</b>
Occam's Razor: the beauty of simplicity	14
Simplicity and the thermostat	14
Simplicity and cognitive theory	15
Research focus 1.2: <i>Reefer madness: behavioural solutions to marijuana problems</i>	17

<b>Part 2: An introduction to the nature of explanation in cognitive psychology</b>	<b>17</b>
<b>How the mind and the brain are related</b>	<b>18</b>
Central state identity theory	18
Type identity theory	18
The different brains problem	19
Token identity theory	19
Function and functional role	20
Functionalism	21
Flow-charts of the mind: distinctions between mind, brain, software and hardware	21
Functional description and a return to the thermostat	22
Functionalism and information processing systems	23
<b>Marr's levels of explanation and cognitive psychology</b>	<b>24</b>
The level of the computational theory	24
The level of the representation and the algorithm	24
The level of the hardware	24
Levels of explanation and information processing systems	25
Research focus 1.3: <i>What's a computer? Half a century playing the imitation game</i>	26
Levels of explanation and reductionism	26
<i>Concluding comments</i>	27
<i>Chapter summary</i>	28
<i>Answers to pinpoint questions</i>	30

## **Chapter 2 Information processing and nature of the mind 31**

<i>Learning objectives</i>	31
<i>Chapter contents</i>	31
<i>Hold the bells! The unfortunate case of the modular fruit machine</i>	32
<i>Reflective questions</i>	32

<b>Part 1: An introduction to computation and cognitive psychology</b>	<b>33</b>
<b>Introduction and preliminary considerations</b>	<b>33</b>
<b>Different methodological approaches to the study of the mind</b>	<b>34</b>
The cognitive approach	35
The artificial intelligence approach	35
The neuroscience approach	36
<b>Information theory and information processing</b>	<b>37</b>
A brief introduction to information theory	37
Information and the notion of redundancy	38
<b>Information theory and human information processing</b>	<b>38</b>
<b>The computational metaphor of mind and human cognition</b>	<b>40</b>
The naked desktop: the internal workings of a digital computer laid bare	40
<b>Physical symbol systems</b>	<b>41</b>
Symbolic representation	41
Symbolic representation and memory	42
Information processing and the internal set of operations	43
Control	43

<b>The special nature of minds and computers</b>	<b>44</b>
Rule-following vs. rule-governed systems	44
Mental computation	46
The formality condition	46
The formality condition and strong AI	47
<b>Part 2: So what is the mind really like?</b>	<b>49</b>
<b>Marr's principle of modular design</b>	<b>49</b>
Research focus 2.1: <i>We are not amusia-ed: is music modularised?</i>	50
<b>Other conceptions of modularity</b>	<b>51</b>
The nature of horizontal faculties	51
The nature of vertical faculties: a different kind of pot head	52
<b>Fodor's modules</b>	<b>53</b>
How is it best to characterise modules?	54
<b>Modularity and cognitive neuropsychology</b>	<b>55</b>
Cognitive neuropsychology	55
Research focus 2.2: <i>Life after trauma: the astonishing case of Phineas Gage and the iron rod</i>	56
The logic of the cognitive neuropsychological approach	57
Association deficits	57
Dissociation deficits	58
Cognitive deficits and cognitive resources	58
Double dissociations	58
Research focus 2.3: <i>It's rude to point: double dissociations and manual behaviour</i>	59
<i>Concluding comments</i>	61
<i>Chapter summary</i>	62
<i>Answers to pinpoint questions</i>	63

## **Chapter 3 Visual processes and visual sensory memory** **64**

<i>Learning objectives</i>	64
<i>Chapter contents</i>	64
<i>Catching the last bus home?</i>	65
<i>Reflective questions</i>	65
<b>Introduction and preliminary considerations</b>	<b>65</b>
<b>An introduction to sensory memory</b>	<b>66</b>
<b>Visual sensory memory: iconic memory</b>	<b>67</b>
Early experimental investigations of iconic memory	68
Research focus 3.1: <i>Blinking heck! What happens to iconic memory when you blink?</i>	72
Iconic memory and visual masking	73
Iconic memory and visible persistence	76
Visible vs. informational persistence	77
Puzzling findings and the traditional icon	80
<b>The 'eye-as-a-camera' view of visual perception</b>	<b>83</b>
The discrete moment and the travelling moment hypotheses	84
Icons as retinal snapshots	86

<b>Coding in the visual system</b>	<b>87</b>
Visual frames of reference	88
Research focus 3.2: <i>Honk if you can hear me: listening to trains inside cars</i>	91
<b>Turvey's (1973) experiments on masking</b>	<b>92</b>
Visual masking and the organisation of the visual system	92
<b>Further evidence on where the icon is</b>	<b>96</b>
Research focus 3.3: <i>Going, going, gone: iconic memory in dementia patients</i>	97
<b>Iconic memory and the more durable store</b>	<b>98</b>
Aperture viewing	98
<i>Concluding comments</i>	101
<i>Chapter summary</i>	102
<i>Answers to pinpoint questions</i>	104

## **Chapter 4 Masking, thresholds and consciousness** **105**

<i>Learning objectives</i>	105
<i>Chapter contents</i>	105
<i>While you were sleeping: The continuing joys of communal living</i>	106
<i>Reflective questions</i>	106
<b>Introduction and preliminary considerations</b>	<b>107</b>
<b>The sequential account of processing and Turvey's work on visual masking</b>	<b>108</b>
The concurrent and contingent model of masking	108
<b>Masking by object substitution</b>	<b>110</b>
Feedforward and feedback processes	111
Feedback as re-entrant visual processes	111
<b>Masking and consciousness</b>	<b>113</b>
Semantic activation without conscious identification?	113
Allport (1977)	114
Problems for Allport (1977) and a re-interpretation of his data	115
<b>Drawing the line between conscious and non-conscious processing</b>	<b>115</b>
Perceptual thresholds	116
<b>Thresholds and conscious perception</b>	<b>118</b>
Research focus 4.1: <i>Did you say something? Subliminal priming in audition</i>	119
The traditional view of an absolute threshold	120
Variable thresholds and subjective factors	120
<b>Thresholds and perceptual defence</b>	<b>122</b>
Research focus 4.2: <i>Slap or tickle: do we have a preference for the detection of negative or positive words?</i>	123
Perceptual defence: a perceptual effect?	124
<b>Thresholds and signal detection theory</b>	<b>125</b>
<b>The traditional interpretation of SDT in information processing terms</b>	<b>128</b>
Perceptual defence a perceptual effect? Broadbent and Gregory (1967a) revisited	129
<b>More recent accounts of semantic activation without conscious identification</b>	<b>131</b>
Marcel's work on semantic activation without conscious identification	131
Perception without awareness? A re-appraisal of Marcel's findings	132
Cheesman and Merikle (1984)	132

Research focus 4.3: <i>Paying your way into consciousness: can post-decision wagers measure awareness?</i>	135
Perception without awareness? More provocative evidence	136
Just how effective is visual masking in halting stimulus processing?	138
<i>Concluding comments</i>	140
<i>Chapter summary</i>	140
<i>Answers to pinpoint questions</i>	142

## Chapter 5 An introduction to perception

143

<i>Learning objectives</i>	143
<i>Chapter contents</i>	143
<i>'It only attacks when the moon is aglow': The Beast of Burnley</i>	144
<i>Reflective questions</i>	144
<b>Introduction and preliminary considerations</b>	<b>144</b>
<b>Distinguishing perception from cognition</b>	<b>145</b>
<b>Drawing a distinction between the perceptual system and the cognitive system</b>	<b>147</b>
<b>Familiarity and perception</b>	<b>148</b>
Familiarity and word recognition	149
Sensory/perceptual accounts of the effects of familiarity	150
Decisional/post-perceptual accounts of familiarity	151
Explaining the word frequency effect	152
Active vs. passive theories of perception	152
Familiarity effects reflect late processes	152
Familiarity effects reflect early processes	153
<b>Recency and expectancy</b>	<b>157</b>
The perception of ambiguous figures	157
Research focus 5.1: <i>Flip-flopping: children's responses to ambiguous figures</i>	158
Attempting to disentangle effects of recency from those of expectancy	159
Recency and repetition priming	160
Expectancy and set	162
Instructional set	163
Mental set	163
More general conclusions	165
<b>The Old Look/New Look schools in perception</b>	<b>166</b>
The Old Look: Gestalt theory	166
The Gestalt laws of perceptual organisation	167
The Principle of Prägnanz	168
Gestalt theory and the brain	168
Mental copies and perceptual organisation	170
Research focus 5.2: <i>The gestation of Gestalt: how infants learn to group perceptually</i>	170
<b>The New Look</b>	<b>172</b>
Bruner's perceptual readiness theory	172
<b>Perception as a process of unconscious inference</b>	<b>173</b>
The likelihood principle	173
The poverty of the stimulus argument	174

Perceptual inference-making	174
Research focus 5.3: <i>You saw the whole of the cube: spatial neglect and Necker drawings</i>	175
Lessons from perceptual illusions	176
Modularity revisited	179
Bottom-up vs. top-down modes of processing	180
<i>Concluding comments</i>	181
<i>Chapter summary</i>	182
<i>Answers to pinpoint questions</i>	183

## Chapter 6 Theories of perception

185

<i>Learning objectives</i>	185
<i>Chapter contents</i>	185
<i>But is it art? Aesthetic observations and twiglets</i>	186
<i>Reflective questions</i>	186
<b>Introduction and preliminary considerations</b>	<b>186</b>
<b>Simplicity and likelihood</b>	<b>187</b>
The minimum principle	187
Critical appraisal of SIT	190
The likelihood principle	191
<b>Simplicity and likelihood reconsidered</b>	<b>193</b>
<b>Simplicity, likelihood and the nature of perception</b>	<b>193</b>
Are short codes all they are cracked up to be?	193
The advantages of the likelihood principle	194
<b>Global-to-local processing</b>	<b>196</b>
Experiments with compound letters	197
Accounting for global-to-local processing	198
Navon's (2003) account of global-to-local processing	200
Change blindness	202
Research focus 6.1: <i>Touchy touchy: the inability to detect changes in the tactile modality</i>	204
<b>Context effects in perception</b>	<b>206</b>
<b>Context in the perception of speech</b>	<b>207</b>
Analysis by synthesis and speech perception	208
Initial appraisal of analysis by synthesis	209
Research focus 6.2: <i>Hear my lips: visual and auditory dominance in the McGurk effect</i>	212
<b>Perception as a process of embellishment</b>	<b>213</b>
Minsky's (1975) frame theory	213
Problems for knowledge-driven accounts of perception	214
<b>Phonemic restoration as an act of perceptual embellishment</b>	<b>216</b>
Detailed theoretical accounts of performance	217
Research focus 6.3: <i>Sorry, I'll read that again: phonemic restoration with the initial phoneme</i>	218
Top-down processing and interactive activation models	218
Interaction activation and phonemic restoration	220
Samuel's findings	220
Perception as constrained hallucination?	221



<b>Pulling it all together</b>	<b>223</b>
Embellishment in perception revisited	223
Top-down influences in perception revisited	224
<i>Concluding comments</i>	225
<i>Chapter summary</i>	225
<i>Answers to pinpoint questions</i>	227

## **Chapter 7 Mental representation 228**

<i>Learning objectives</i>	228
<i>Chapter contents</i>	228
<i>You are nothing!</i>	229
<i>Reflective questions</i>	229
<b>Introduction and preliminary considerations</b>	<b>230</b>
<b>How rats running mazes led to some insights about mental representation</b>	<b>230</b>
<b>Maps and cognitive maps</b>	<b>231</b>
Analogical representation	232
Research focus 7.1: <i>Is 8 to 9 further than 10 to 9? Representing the mental number line</i>	236
<b>Tolman's alternative theoretical perspective to behaviourism</b>	<b>237</b>
Some examples of Tolman's experiments on cognitive maps	238
<b>Mental operations carried out on mental maps</b>	<b>240</b>
Research focus 7.2: <i>You can't get there from here: the cognitive map of a brain-damaged London taxi driver</i>	242
<b>Maps and pictures-in-the-head</b>	<b>242</b>
Mental pictures	242
<b>Kosslyn's view of mental pictures</b>	<b>244</b>
Mental images and the mental cathode-ray screen	244
<b>Dual-format systems</b>	<b>245</b>
<b>Mental scanning</b>	<b>246</b>
Further provocative data	248
<b>Real space in the head: what is mental space really like?</b>	<b>249</b>
Further evidence for analogical representation	249
The dissenting view: descriptive, not depictive representations	250
<b>Depictive representations and a pause for thought</b>	<b>251</b>
<b>The ambiguity of mental images</b>	<b>252</b>
<b>Mental rotation</b>	<b>255</b>
Research focus 7.3: <i>Monkey see, monkey do, monkey rotate? The mental life of a macaque</i>	257
<b>Descriptive representations</b>	<b>258</b>
Mentalese – the language of thought	258
Structural descriptions of shapes	259
Shape discriminations and template matching	262
The lingua mentis and propositional representation	263
<i>Concluding comments</i>	267
<i>Chapter summary</i>	268
<i>Answers to pinpoint questions</i>	270

## Chapter 8 Attention: general introduction, basic models and data 271

<i>Learning objectives</i>	271
<i>Chapter contents</i>	271
<i>A cognitive psychologist in the DJ booth</i>	272
<i>Reflective questions</i>	273
<b>Introduction and preliminary considerations</b>	<b>273</b>
<b>Out with the new and in with the old</b>	<b>273</b>
<b>Early filtering accounts of selection</b>	<b>274</b>
Selection by filtering	275
Information processing constraints in the model	277
Split-span experiments	278
Shadowing experiments	280
Provocative data – challenges to the early filter account	280
Research focus 8.1: <i>I think my ears are burning: why do I hear my name across a crowded room?</i>	281
<b>The attenuated filter model of attention</b>	<b>282</b>
Further revisions to the original filter theory	283
The differences between stimulus set and response set	284
<b>Late filtering accounts of selection</b>	<b>285</b>
Evidence in support of late selection	286
<b>No 'structural bottleneck' accounts of attention</b>	<b>288</b>
<b>The notion of attentional resources</b>	<b>290</b>
A single pool of resources?	290
Single resource accounts and the dual-task decrement	291
Research focus 8.2: <i>Patting my head and rubbing my belly: can I really do two things at once?</i>	292
Appraisal of single resource theories	293
Resources and resource allocation in more detail	295
Attentional resources or something else?	296
<b>Multiple resources?</b>	<b>299</b>
Research focus 8.3: <i>'Sorry, I can't speak now, I'm in the hospital': mobile phone use and driving as dual task</i>	300
<b>When doing two things at once is as easy as doing either alone</b>	<b>300</b>
<b>Pulling it all together</b>	<b>302</b>
Controlled parallel processing	304
<b>Perceptual load theory</b>	<b>305</b>
Load theory and effects of varying perceptual load	306
Load theory and effects of varying memory load	307
<i>Concluding comments</i>	309
<i>Chapter summary</i>	309
<i>Answers to pinpoint questions</i>	310

## Chapter 9 Attentional constraints and performance limitations 312

<i>Learning objectives</i>	312
<i>Chapter contents</i>	312
<i>Back in the booth</i>	313
<i>Reflective questions</i>	313

<b>Introduction and preliminary considerations</b>	<b>313</b>
<b>Stages of information processing</b>	<b>314</b>
Further analyses of dual-task performance	316
Research focus 9.1: <i>Counting the cost: Alzheimer's disease and dual-task performance</i>	317
<b>Studies of the psychological refractory period</b>	<b>317</b>
Understanding the PRP	319
Pashler's (1994) four principles of the central bottleneck theory	320
Testing the principles of the central bottleneck account	322
Additivity and under-additivity on RT2	323
<b>Standing back from the central bottlenecks</b>	<b>328</b>
Capacity sharing?	328
<b>PRP and driving</b>	<b>329</b>
Research focus 9.2: <i>Because practice makes . . . : PRP, practice and the elderly</i>	330
<b>Task switching</b>	<b>331</b>
Basic concepts and findings from the task-switching literature	331
Task set reconfiguration	333
<b>Some additional theoretical ideas</b>	<b>336</b>
The task carryover account	336
Switching costs and proactive interference	337
Research focus 9.3: <i>Totally wired? The effect of caffeine on task switching</i>	338
<i>Concluding comments</i>	339
<i>Chapter summary</i>	339
<i>Answers to pinpoint questions</i>	340

## **Chapter 10 Human memory: an introduction** **342**

<i>Learning objectives</i>	342
<i>Chapter contents</i>	342
<i>You must remember this? A levels of processing approach to exam cramming</i>	343
<i>Reflective questions</i>	343
<b>Introduction and preliminary considerations</b>	<b>343</b>
<b>Libraries/warehouses/computers</b>	<b>345</b>
<b>The modularity of mind revisited</b>	<b>346</b>
Memory as a horizontal faculty	346
<b>Organisation and memory</b>	<b>349</b>
Organisation vs. associations?	351
<b>The levels of processing approach</b>	<b>351</b>
Problems with levels and alternative accounts	352
<b>Compartmentalisation of memory</b>	<b>354</b>
Episodic vs. semantic memory	354
Further evidence for the episodic/semantic distinction	355
<b>Further divisions between memory systems</b>	<b>356</b>
Short-term and long-term memory	356
Forgetting and short-term memory	358
Research focus 10.1: <i>Playing tag on . . . which street? Childhood memories for street names</i>	359

Further evidence for trace decay	360
Further evidence that bears on the short-term/long-term memory distinction	364
<b>The modal model and its detractors</b>	<b>367</b>
Arguments about recency effects	368
Research focus 10.2: <i>Faithful all ye come: serial position effects in hymns</i>	370
Alternative accounts of the recency effects	370
<b>Memory as a vertical faculty</b>	<b>374</b>
The working memory model	374
Visuo-spatial, short-term memory	378
The central executive	379
Research focus 10.3: <i>Standing in the way of control: restarting the central executive after brain injury</i>	380
The episodic buffer	382
<i>Concluding comments</i>	383
<i>Chapter summary</i>	384
<i>Answers to pinpoint questions</i>	385

## Chapter 11 Human memory: fallibilities and failures 387

<i>Learning objectives</i>	387
<i>Chapter contents</i>	387
<i>Night</i>	388
<i>Reflective questions</i>	388
<b>Introduction and preliminary considerations</b>	<b>388</b>
<b>Headed records</b>	<b>389</b>
Headed records and various memory phenomena	390
<b>Eyewitness memory</b>	<b>391</b>
Reconstructive and destructive processes: the misleading information effect	392
Research focus 11.1: <i>But I heard them with my own ears! An exploration in earwitness testimony</i>	393
Headed records and the misleading information effect	393
Alternative accounts of the misleading information effect	395
Further evidence that bears on destructive processes	396
The misleading information effect and encoding specificity	397
Going beyond encoding specificity	398
Research focus 11.2: <i>Do you remember the first time? Remembering misleading information about upcoming novel events</i>	399
<b>Even more accounts of the misleading information effect</b>	<b>400</b>
Signal detection theory, recognition memory and explaining false memories	400
False memories and response bias	403
False memories in the real world	405
Research focus 11.3: <i>Remembering the mothership: false memories and alien abductees</i>	407
False memories and aging	408
False autobiographical memories	411
Memory and the remember/know distinction	412

<i>Concluding comments</i>	413
<i>Chapter summary</i>	414
<i>Answers to pinpoint questions</i>	415

## **Chapter 12 Semantic memory and concepts 416**

<i>Learning objectives</i>	416
<i>Chapter contents</i>	416
<i>Wardrobe refreshing and memories of the Pyramid stage</i>	417
<i>Reflective questions</i>	417

### **Introduction and preliminary considerations 418**

Key terms and key concepts	418
Extensions and intensions	419
Propositions and propositional networks	421
Semantic network representations of human memory	422
Semantic networks	423
A psychologically plausible semantic network?	426
Data that challenge the Collins and Quillian account	428

### **Feature models 430**

Psychological space and multi-dimensional scaling	430
Research focus 12.1: <i>'I think I'm gonna barf': the different dimensions of disgust</i>	432
The Smith et al. (1974) featural model	432
Difficult findings for the featural account	434
Research focus 12.2: <i>Do geese or squirrels lay eggs? Semantic memory in a schizophrenic</i>	435

### **Semantic features, semantic primitives and cogits 436**

Semantic features as defined on semantic dimensions	436
Semantic primitives as the atoms of meaning	436
Semantic features and semantic feature norms	437
Semantic features and semantic relatedness	437
Localist vs. distributed models	441
Distributed representation and mental chemistry	442
The Rumelhart and Todd (1993) model of semantic memory	444
Connectionist models and the simulation of knowledge acquisition	445
Training connectionist networks	446
Hidden unit representations	449
Research focus 12.3: <i>What should I call you? Networks, nominal competition and naming</i>	452

### **Prototypes 453**

Early experimental work on prototypes	454
Conceptual categories and family resemblance	455
Prototype formation	456
The internal structure of mental taxonomies	457
The basic level and the structure of mental categories	457
Prototype models vs. exemplar-based models	459

<i>Concluding comments</i>	460
<i>Chapter summary</i>	461
<i>Answers to pinpoint questions</i>	462

<b>Chapter 13</b>	<b>Object recognition</b>	<b>464</b>
	<i>Learning objectives</i>	464
	<i>Chapter contents</i>	464
	<i>But mine was small, grey and shiny as well: Disputes at baggage carousel number 6</i>	465
	<i>Reflective questions</i>	465
	<b>Introduction and preliminary considerations</b>	<b>466</b>
	<b>A general framework for thinking about object recognition</b>	<b>467</b>
	Sorting out 'recognition', 'identification' and 'classification'	467
	<b>The basic level advantage</b>	<b>468</b>
	The crude-to-fine framework reappears	469
	<b>Further claims about the basic level advantage and perceptual processing</b>	<b>470</b>
	<b>The basic level advantage and expertise</b>	<b>471</b>
	Experts and 'experts'	472
	Research focus 13.1: <i>Knowing your plonk from your plink: what makes a wine expert?</i>	474
	<b>Further issues and controversies in visual object recognition</b>	<b>475</b>
	<b>Additional useful terminology: introduction to Marr's theory</b>	<b>477</b>
	2D representations	477
	2½D representations	477
	Marr's levels of representation in vision	478
	The catalogue of 3D models	479
	Object recognition and the process of matching	481
	Object recognition and axis-based descriptions	481
	<b>Connections with the previous material</b>	<b>483</b>
	The basic first hypothesis revisited	483
	Object recognition via the recognition of part of an object	483
	<b>Empirical evidence that bears on Marr's theory</b>	<b>483</b>
	Can we imagine how objects look from other viewpoints?	484
	Research focus 13.2: <i>'Narrowing towards the back': foreshortening without sight</i>	489
	<b>Restricted viewpoint-invariant theories</b>	<b>490</b>
	Biederman's recognition by components account	491
	Appraisal of RBC	494
	Viewpoint-dependent theories	496
	<b>Privileged view or privileged views?</b>	<b>498</b>
	The chorus of prototypes	499
	Research focus 13.3: <i>Meet the Greebles: the effects of training on an individual with visual agnosia</i>	502
	<b>Evidence regarding context and object recognition</b>	<b>503</b>
	<i>Concluding comments</i>	506
	<i>Chapter summary</i>	507
	<i>Answers to pinpoint questions</i>	508
<b>Chapter 14</b>	<b>The nature of language and its relation to the other mental faculties</b>	<b>509</b>
	<i>Learning objectives</i>	509
	<i>Chapter contents</i>	509

<i>Off the starting blocks: Language on a lazy Sunday afternoon</i>	510
<i>Reflective questions</i>	510
<b>Introduction and preliminary considerations</b>	<b>511</b>
<b>Some basic characteristics of natural language</b>	<b>511</b>
Performance vs. competence	511
<b>The difference between the surface forms of language and the deeper forms</b>	<b>513</b>
Linguistics vs. psycholinguistics	514
<b>The componential nature of language</b>	<b>515</b>
The phonological structure	515
The syntactic structure	515
The semantic structure	517
Research focus 14.1: <i>I know it, I know it, it's on the tip of my fingers: failure of sign retrieval in the deaf</i>	519
<b>Other basic characteristics of natural language</b>	<b>519</b>
Productivity	520
Systematicity	520
Compositionality	521
Recursion	521
<b>Syntactic parsing on-line</b>	<b>524</b>
Syntax and the garden path	524
Research focus 14.2: <i>While Anna dressed the baby spit up on the bed: what we believe happened as we walk down the garden path</i>	526
Parsing according to minimal attachment	527
Parsing according to late closure	529
Multiple-constraint satisfaction accounts of parsing: semantically driven parsing	530
<b>Mental rules</b>	<b>532</b>
Rule-following vs. rule-governed devices reconsidered	533
<b>The past-tense debate</b>	<b>533</b>
The establishment account of past-tense learning	534
Connectionist accounts of past-tense learning	535
Past-tense learning according to Rumelhart and McClelland (1986)	535
Research focus 14.3: <i>Holded the front page! Sex differences in past-tense overgeneralisations</i>	539
Appraising the Rumelhart and McClelland past-tense model	540
<b>Language, knowledge and perception</b>	<b>542</b>
A final general framework for thinking about the relations between language and the other related faculties	542
Language, mental categories and perception	544
Influences of categorisation on perceptual discrimination – Goldstone (1994)	544
Categorical perception and verbal labelling	547
Categorical perception, colour perception and colour naming	549
The Whorf hypothesis vs. the Roschian hypothesis	549
The early work of Heider/Rosch	550
More recent work by Roberson and colleagues	551
<i>Concluding comments</i>	553
<i>Chapter summary</i>	554
<i>Answers to pinpoint questions</i>	556

**Chapter 15 Reasoning****557**

<i>Learning objectives</i>	557
<i>Chapter contents</i>	557
<i>A day at the races</i>	558
<i>Reflective questions</i>	558
<b>Introduction and preliminary considerations</b>	<b>559</b>
<b>The dual system account of reasoning</b>	<b>559</b>
The associative system	559
The rule-based system	559
Distinguishing between the two systems	560
Linda-the-bank-teller problem	560
The conjunction fallacy and representativeness	561
<b>Reasoning by heuristics and biases</b>	<b>562</b>
The representative heuristic	563
The availability heuristic	563
Base rate neglect	564
Research focus 15.1: <i>You are either with us or against us: the heuristics of terror</i>	566
<b>The medical diagnosis problem</b>	<b>567</b>
<b>Heuristics and biases and the competence/performance distinction</b>	<b>570</b>
The standard picture	570
Why people are not Bayesian reasoners	571
<b>Natural frequencies vs. conditional probabilities</b>	<b>572</b>
<b>The two systems of reasoning revisited</b>	<b>574</b>
<b>Reasoning in evolutionary terms</b>	<b>575</b>
Evolution and the dual systems	575
Evolution and reasoning the fast and frugal way	576
Human reasoning as a process of satisficing	576
Research focus 15.2: <i>When enough is enough: satisficing, maximising and the way you feel</i>	577
<b>Evolution and the modularity of mind</b>	<b>579</b>
<b>Deductive and inductive inference</b>	<b>580</b>
Deductive inference	580
Inductive inference	580
<b>The Wason selection task</b>	<b>581</b>
Social contract theory	583
Feeling obliged? Deontic and indicative conditionals	585
The selection task and attempts to eliminate system 2	585
Appraising the information gain account	587
<b>Deductive reasoning and syllogisms</b>	<b>589</b>
Some definitions and useful terminology	589
<b>Psychological aspects of syllogistic reasoning</b>	<b>591</b>
The figural effect and mental models	592
Research focus 15.3: <i>Looking at the evidence: eye movements and syllogistic reasoning</i>	595
Mental models and mental imagery	596
<i>Concluding comments</i>	597
<i>Chapter summary</i>	598
<i>Answers to pinpoint questions</i>	599



**Chapter 16 Cognition and emotion****600**

<i>Learning objectives</i>	600
<i>Chapter contents</i>	600
<i>Master of your mood?</i>	601
<i>Reflective questions</i>	601
<b>Introduction and preliminary considerations</b>	<b>601</b>
<b>Towards a cognitive theory of emotions</b>	<b>603</b>
The 'five' basic emotions	604
Emotional vs. non-emotional modes of the cognitive system	604
Research focus 16.1: <i>If you're happy and you know it, press a key: cultural differences in recognising basic emotions</i>	605
<b>Conscious versus unconscious processing</b>	<b>607</b>
Automatic vs. controlled processes	608
Searching for emotionally charged stimuli	609
The face-in-the-crowd effect	609
Further work on the face-in-the-crowd effect	613
Appraisal of the work on facial expression detection	617
Other attentional tasks and facial expression processing	617
Research focus 16.2: <i>Going for gold? What your face looks like when you come second</i>	618
The flanker task and emotional faces	619
<b>Eye gaze, facial expression and the direction of attention</b>	<b>621</b>
The basic spatial cueing task	621
Explaining spatial cueing	624
Covert vs. overt shifts of attention	624
Experimental work on following eye gaze	625
Further experiments on the potency of eye gaze	626
<b>Detecting threatening objects</b>	<b>629</b>
Further evidence for the animal advantage	630
Research focus 16.3: <i>Freeze! Coming face to face with threat</i>	631
<b>Other indications of the influence of emotion on cognition</b>	<b>632</b>
Mood induction in 'normal, healthy adults'	632
Mood induction and ethical considerations	633
'Mood' induction and 'mood'	633
<b>Mood and judgement</b>	<b>635</b>
Depressive realism	635
Further work on depressive realism	636
<i>Concluding comments</i>	637
<i>Chapter summary</i>	638
<i>Answers to pinpoint questions</i>	640
<i>Bibliography</i>	641
<i>Glossary</i>	665
<i>Name index</i>	681
<i>Subject index</i>	688
<i>Publisher's acknowledgements</i>	699