

# Contents

<i>Preface</i>	page xiii
<i>Acknowledgments</i>	xvii
<b>1 What We Know About Intelligence From the Weight of Studies</b>	<b>1</b>
Learning Objectives	1
Introduction	1
1.1 What is Intelligence? Do You Know It When You See It?	2
1.2 Defining Intelligence for Empirical Research	4
1.3 The Structure of Mental Abilities and the <i>g</i> -Factor	5
1.4 Alternative Models	9
1.5 Focus on the <i>g</i> -Factor	10
1.6 Measuring Intelligence and IQ	11
1.7 Some Other Intelligence Tests	15
1.8 Myth: Intelligence Tests are Biased or Meaningless	17
1.9 The Key Problem for “Measuring” Intelligence	18
1.10 Four Kinds of Predictive Validity for Intelligence Tests	19
1.11 Why Do Myths About Intelligence Definitions and Measurement Persist?	33
Chapter 1 Summary	35
Review Questions	35
Further Reading	36
<b>2 Nature More than Nurture: The Impact of Genetics on Intelligence</b>	<b>37</b>
Learning Objectives	38
Introduction	38
2.1 The Evolving View of Genetics	40
2.2 Early Failures to Boost IQ	42
2.3 “Fraud” Fails to Stop Genetic Progress	46
2.4 Quantitative Genetic Findings also Support a Role for Environmental Factors	50
2.5 Molecular Genetics and the Hunt for Intelligence Genes	56
2.6 Seven Recent Noteworthy Studies of Molecular Genetic Progress	61
Chapter 2 Summary	66
Review Questions	66
Further Reading	67

<b>3 Peeking Inside the Living Brain: Neuroimaging Is a Game-changer for Intelligence Research</b>	68
Learning Objectives	68
Introduction	68
3.1 The First PET Studies	69
3.2 Brain Efficiency	73
3.3 Not All Brains Work in the Same Way	76
3.4 What the Early PET Studies Revealed and What They Did Not	79
3.5 The First MRI Studies	81
3.6 Basic Structural MRI Findings	84
3.7 Improved MRI Analyses Yield Consistent and Inconsistent Results	85
3.8 Imaging White Matter Tracts with Two Methods	90
3.9 Functional MRI (fMRI)	91
3.10 The Parieto-frontal Integration Theory (PFIT)	92
3.11 Einstein's Brain	95
Chapter 3 Summary	96
Review Questions	96
Further Reading	97
<b>4 50 Shades of Gray Matter: A Brain Image of Intelligence is Worth a Thousand Words</b>	98
Learning Objectives	98
Introduction	98
4.1 Brain Networks and Intelligence	100
4.2 Functional Brain Efficiency – is Seeing Believing?	110
4.3 Predicting IQ From Brain Images	118
4.4 Are “Intelligence” and “Reasoning” Synonyms?	124
4.5 Common Genes for Brain Structure and Intelligence	126
4.6 Brain Imaging and Molecular Genetics	132
Chapter 4 Summary	135
Review Questions	136
Further Reading	136
<b>5 The Holy Grail: Can Neuroscience Boost Intelligence?</b>	137
Learning Objectives	137
Introduction	137
5.1 Case 1: Mozart and the Brain	139
5.2 Case 2: You Must Remember This, and This, and This ...	143



5.3	Case 3: Can Computer Games for Children Raise IQ?	150
5.4	Where are the IQ Pills?	155
5.5	Magnetic Fields, Electric Shocks, and Cold Lasers Target Brain Processes	158
5.6	The Missing Weight of Evidence for Enhancement	162
	Chapter 5 Summary	164
	Review Questions	165
	Further Reading	165

<b>6</b>	<b>As Neuroscience Advances, What's Next for Intelligence Research?</b>	166
	Learning Objectives	166
	Introduction	167
6.1	From Psychometric Testing to Chronometric Testing	168
6.2	Cognitive Neuroscience of Memory and Super-Memory	171
6.3	Bridging Human and Animal Research with New Tools	
	Neuron by Neuron	175
6.4	Bridging Human and Machine Intelligence Circuit by Circuit	179
6.5	Consciousness and Creativity	183
6.6	Neuro-poverty and Neuro-Social–Economic Status (SES): Implications for Public Policy Based on the Neuroscience of Intelligence	192
6.7	Final Thoughts	200
	Chapter 6 Summary	202
	Further Reading	202
	Glossary	204
	References	210
	Index	243

*The color plate section can be found between pp. 142 and 143.*