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Understanding Intelligence

Have you ever wondered why psychologists still can't agree on what intelligence is? Or felt dismayed by debates around individual differences? Criticising the pitfalls of IQ testing, this book explains the true nature of intelligent systems, and their evolution from cells to brains to culture and human minds.

Understanding Intelligence debunks many of the myths and misunderstandings surrounding intelligence. It takes a new look at the nature of the environment and the development of 'talent' and achievement. This brings fresh and radical implications for promoting intelligence and creativity, and prompts readers to reconsider their own possibilities and aspirations.

Providing a broad context to the subject, the author also unmasks the ideological distortions of intelligence in racism and eugenics, and the suppressed expectations across social classes and genders.

This book is a must-read for anyone curious about our own intelligence.

Ken Richardson is a former senior lecturer at the Open University, UK, and an independent researcher, consultant, and author. After completing a doctorate in brain biochemistry he became interested in cognitive systems, chiefly developmental, and how these areas, as intelligent systems, are inter-related through evolution.

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The ***Understanding Life*** series is for anyone wanting an engaging and concise way into a key biological topic. Offering a multidisciplinary perspective, these accessible guides address common misconceptions and misunderstandings in a thoughtful way to help stimulate debate and encourage a more in-depth understanding. Written by leading thinkers in each field, these books are for anyone wanting an expert overview that will enable clearer thinking on each topic.

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'Ken Richardson has written a masterful book about intelligence. In contrast to what leading behavioural geneticists and psychometrically oriented psychologists see as the moderately or highly heritable trait of general intelligence (IQ), Richardson explains why psychometric and behavioural genetic arguments fail, and how intelligence should be seen as a socially acquired characteristic. A longstanding expert on intelligence, he writes in a manner that can be understood by both academic and general readers. I strongly recommend this book as an accessible and important counterweight to mainstream descriptions of intelligence in the fields of psychology and behavioural genetics, and in the media.'
Jay Joseph, Psy.D., psychologist and author, Oakland, California, USA

'Ken Richardson's *Understanding Intelligence* is a timely and important addition to Cambridge University Press's groundbreaking Understanding Life series. Richardson provides a "natural history of intelligence", and no facet of that complex topic goes untouched – adaptive evolution, embryology, endocrinology, circadian rhythms, neural networks, cooperative hunting. In our current moment, where scholars and politicians alike are calling for gene-guided education and appealing to innate differences as the cause of racial disparities, Richardson debunks myth after myth about cognitive ability: that the brain is best conceptualised as a machine, that IQ tests measure intelligence, that different racial groups have naturally different intellectual aptitudes, that the genome is a programme for cognitive development. The esteemed psychologist, in exchange, offers a vision of intelligence as a dynamic, interactive, developing, adaptive system – a system that allows every person to intellectually flourish, if only they are given the opportunity.'
James Tabery, Professor of Philosophy, University of Utah, USA

'For decades, Ken Richardson has been a leading voice within the critical approaches to intelligence in psychology. He patiently and determinedly interrogated the often taken for granted assumptions – and myths – about the meaning of intelligence, about how it can be measured and tested, about its heritability or its applicability as a measure of intellectual ability in the school or the workplace. *Understanding Intelligence* provides a thoroughly researched and persuasively argued up-to-date overview of this important work. It is sure to become an indispensable resource for both academics and practitioners, and indeed for anyone interested in one of psychology's most controversial, and flawed, concepts.'
Jovan Byford, Senior Lecturer in Psychology, The Open University, UK

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Foreword

What is intelligence? People often take the answer to this question as simple and straightforward. It seems to be about how 'smart' one is, and to be considered something that can be easily and objectively measured, for example, by how good at math one is, or by how well one does in problem-solving. There even exist smartphone apps that claim to measure one's intelligence. Or so the story goes. Intelligence is an attribute that is considered a good one, yet it is one of the most used ones to support discrimination. This was most prominently shown during the era of eugenics, when people described as 'feebleminded' might even be sterilised in order to be precluded from reproducing. But this is not over. Several prominent people nowadays still argue about the intellectual superiority of men over women; of 'white' people over 'black' people; of humans over other species. This is based on an important assumption: that we can accurately and unbiasedly measure intelligence. In this magnificent book Ken Richardson shows that it is far from simple and straightforward not only to measure intelligence, but also to define it. The author explains the biases of the widely known IQ tests, and their validity problems. Most importantly, he advances a broader conceptualisation of intelligence that will make you realise that it is a lot more than the narrow set of skills measured by IQ tests. It is a property of life, one that we should admire and not use for discrimination. To paraphrase a famous saying: several decades of unwarranted discrimination are enough.

Kostas Kampourakis, Series Editor

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Preface

Superficially, intelligence seems so easy to understand. It's what most separates us from all other animals; as defining of humanity as flying is of birds or swimming is of fish. It's also one of the first things we note in distinguishing people from one another. You may mention to friends that so-and-so is 'intelligent', perhaps using a common word such as 'smart' or 'bright'. They will tend to nod as if we all know what we mean.

What we really mean will usually be rather vague, though. In spite of a constant presence in our lives and institutions, it comes with variable connotations. What we mean divides left and right in politics; legitimises people's places on social ladders; raises daunting issues about equality and social justice; and has long been used to justify different treatments of genders, social classes, and 'races', as well as some appalling acts done in the name of this concept.

How are we to understand it then? What is it, really? Scholars, from Ancient Greece to modern times, have wrestled with that question. Today, psychologists often think they've cracked it by presenting us with 'definitions' of intelligence. Take the recent example of Richard Haier (author of *The Neuroscience of Intelligence*, 2016) and Stuart Ritchie (author of *Intelligence: All that Matters*, 2018). Both adopt Linda Gottfredson's definition (from an article in 1997):

> [Intelligence] ... involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill,

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> or test-taking smarts. Rather it reflects a broader and deeper capability for comprehending our surroundings – 'catching on', 'making sense' of things, or 'figuring out' what to do.

I hope you've got that – 'catching on', 'making sense', or 'figuring out' are hardly pristine scientific concepts. Nor (as we shall see) is there a lot of agreement about the real nature of reasoning, problem-solving, and so on. The problem is that definitions only sketch the *boundaries* of a function; outlining what it does or does not do, without describing the function itself. Definitions *ad nauseum* do not tell us much about intelligent functions, how they originated, develop, and materialise in such splendid and variable forms. Telling us all the things that a machine or computer can do does not tell us how they do it.

So the old joke still stands: ask a dozen psychologists what intelligence is and you'll get a dozen different answers. There's also that other one suggesting that 'intelligence is what intelligence tests test'. When it comes to describing what individual differences are differences *in*, we get simple mechanical metaphors – energy, power, strength, speed, capacity, and efficiency are common. Others are sharp, smart, bright, dull, and so on – again, hardly scientific. We *still* need to know what kind of function intelligence really is: not just what it does, but how it does what it does. Until we achieve that, the whole subject slips and slides like a wayward bar of soap under the shower.

Anyone might have expected objective (dare I say intelligent?) scientists to have solved the problem by now. Why not? Well, intelligence is not a neutral subject like liver functions or the immune system, researched dispassionately. Cutting across and smearing our streams of inquiry are other potent forces. The concept of intelligence, after all, has a huge bearing on social and political issues: as a supposed resource for a nation's economy; for selecting the right people for the right education, training, and jobs; and for justifying the ordering of people on a social ladder, with different treatments, powers, and privileges. That has stirred long-standing nature–nurture debates not entirely conducive to objective science.

Science is, of course, often funded and harnessed for socially practical ends. But different hunches or beliefs about intelligence reflect fundamentally different preconceptions of human nature. That is why intelligence has

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often become an ideological football. That's a danger we should understand, because 'applied intelligence' can lead to dire consequences. Historically, IQ testing has been intertwined with eugenics movements, as well as proving the genetic inferiority of the working classes and different 'races'. Sad things have been said and done in its name.

Many scientists are currently fearful of a new wave of such things. Nightmarish elements of the designer baby industry were portrayed in the 1997 film *GATTACA* (see Kostas Kampourakis' discussion in *Understanding Genes*). In his blog in 2014, later UK government adviser Dominic Cummings wrote that, when a sufficient number of 'IQ genes' have been identified, then the state might consider subsidising suitable couples for selecting 'the egg that has the highest prediction for IQ'. Meanwhile, on the futility of intervention in what he sees as natural forces, Boris Johnson (now, in 2021, UK prime minister), was warning that, 'Whatever you may think of the value of IQ tests it is surely relevant to a conversation about equality that as many as 16% of our species have an IQ below 85 while about 2 per cent have an IQ above 130 . . . The harder you shake the pack the easier it will be for some cornflakes to get to the top' (Third Margaret Thatcher Lecture, 2013).

Like a gale on a homing pigeon, such ideological forces have continuously blown objective inquiry off course and onto troubled reefs. Yet, intelligence remains a subject of genuine scientific interest to many biologists, psychologists, philosophers, sociologists, and anthropologists. For generations, they have asked genuine questions: What is it? How did it originate? How did it evolve? What form does it take in humans and in individuals? How does it vary, both across species and between humans as individuals?

Meanwhile, results pouring out from other fields – biophysics, genetics, molecular biology, physiology, evolutionary studies, brain sciences, cognitive psychology, and others – have been spinning out new strands needing to be pulled together. They are beginning to cohere into a compelling story. It says that intelligence is not something only in our brains and, thanks to their genes, good in only Johnson's top 2 per cent. Rather, it has been at the very roots of life from the beginning, impelling evolution, emerging further in brains and cognitive systems, and re-emerging in unsuspected, and sadly understated, forms in all humans.

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Using those strands to bring intelligence to life is the ambition of this book. I try to present a kind of natural history of intelligence. My underlying message is: 'Intelligence is life; life is intelligence.' My hope in writing this book is that it will bring a better understanding of life's most wonderful phenomenon, and also that it will encourage people to banish fatalism and pessimism about their own abilities, and more confidently *create* their potential for democratic engagement.

One of the most exciting aspects of efforts such as this is that of working with the ideas of many other people. Those who have unwittingly helped are too numerous to name here, but I hope they recognise my thanks in these pages. A number of friends and colleagues did, however, take the trouble to plough through most or all of the pages to offer suggestions and criticism. I would like to particularly thank Mike Jones, Jay Joseph, Stephen Block, Meg Brown, Philip Thompson, Susan Richardson, and Annie Watt. They were probably more helpful than they know. I'm also grateful to series editor Kostas Kampourakis for being exceedingly detailed and thorough in helping to shape up the drafts. I can only hope the result is a worthy reflection of all that wisdom.

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