CHAPTER 1

A Brief Voyage to the Past

1.1 Introduction: We Are Not All Equally Intelligent

This book is about the nature of intelligence, its causes and uses, and why it differs among people. Scientific psychology has much to say about intelligence, but unfortunately, much that has been said is misunderstood.

There is a reason for this. The findings derived from empirical studies of intelligence have important and sometimes uncomfortable social consequences. For example, school systems might use intelligence and cognitive ability tests to stream students into specialized programs. Colleges have used cognitive tests to screen applicants for admission to higher education opportunities, at least until recently. Scholastic tests are not called intelligence tests, but they typically show substantial correlations with them (Frey and Detterman, 2004; Kaufman et al., 2012; Pokropek et al., 2021). This is hard to accept when students are disappointed or adversely affected by test results. It is even more difficult to acknowledge average score differences among some populations, such as

students from different countries completing the widely used standardized Program for International Student Assessment (PISA) tests of mathematical ability (Rindermann, 2018). Blame the test or misrepresent the concept of intelligence are common exhortations, which have had recent impact as many colleges and universities have abandoned the use of standardized tests as part of the admissions process.

Testing is not confined to the educational system. Volunteers for military services must obtain passing scores on a test of general mental competence. Job applicants often are tested for cognitive abilities. There are a variety of special assistance programs for people who do not have the cognitive competence to cope with the complexities of the modern world. Low intelligence test scores can be offered as evidence of diminished mental capacity during criminal trials (Oleson, 2016).

There is agreement that some people are smarter than others, but things become complex when we try to be precise about what this means. Every knowledgeable person, for instance, would agree that Pasteur and Michelangelo were both highly intelligent, but was either more intelligent than the other? How did their intelligence differences come about, and why did they differ so much from most people? Such questions began to be formalized back in sixteenth-century Europe.

1.1.1 *Spain, Sixteenth Century*

The Spaniard Huarte de San Juan (1529–1588) was a physician who is now recognized as the father of differential psychology. His book *The Examination of Wits* (1575) connected psychology and biology, discussing differences among people. The book was a huge bestseller at the time, and it was translated into the main European languages (English, French, German, and Italian). Huarte's ideas influenced authors such as Francis Bacon, David Hume, Immanuel Kant, Jean-Jacques Rousseau, Francis Galton, and Noam Chomsky, to name a few.

Huarte emerged in the middle of a rich intellectual environment. As described by Robert Goodwin, arts and sciences flourished in the so-called Spanish Golden Age (Goodwin, 2015). This period began in 1492 – when the Spaniards connected the Old with the New World – and lasted until approximately 1659. During the kingship of Philip II (1556–1598), Spain achieved its greatest international influence and power (it was known as the empire on which the sun never set). The broad social context had strong positive impact on the intellectual milieu within this first global empire connecting Europe, America, and Asia. Thus, for instance, the main residence of Philip II (El Escorial, Madrid) was the epicenter of a variety of scientific and cultural developments: (1) it included the greatest private library in the world at the time (14,000 volumes), (2) scientists from different countries were invited to discuss a variety of topics, (3) the academy of mathematics was funded in 1582, (4) intellectuals were protected by the monarch, and (5) the judicial system was greatly improved, influencing the rest of the world.

Organizing such a huge global empire required efficient managing of the available human capital across the multiple connected world regions, and Huarte applied his theoretical framework for matching humans with the explosion of new occupations. Huarte noted that different occupations require distinguishable mental abilities, and he thought it would be possible to analyze these requirements to achieve the goal of matching them to people's mental abilities. He argued that both individuals and society would benefit from this systematic approach.

Huarte described three mental faculties/abilities: (1) understanding, (2) memory, and (3) imagination. He argued that these faculties are present in unique combinations within individual brains and could be characterized by a number of physical features.

He thought that when people attack problems, some will use their imagination to envisage how a solution might work out, while others will rely on their memories of solutions that have worked in the past. Huarte also defined understanding (*entendimiento*) as a distinguishable ability. Huarte's distinction between problem solving by imagination or by memory is mirrored in contemporary

models of intelligence that distinguish between abstract reasoning ability and the ability to apply previously learned solution methods, as we will see later in this book.

He also anticipated another contemporary idea: the need to have a biological explanation for intelligence. Huarte offered a theory based on the sixteenth-century notion that the body is governed by four humors – blood, bile, black bile, and phlegm. Although that old formulation is no longer viable, one of the most active areas of current intelligence research deals with the relation between intelligence and the brain (Haier, 2017), as we will detail in Chapter 5.

As noted, Huarte analyzed how to match people and occupations for the benefit of both individuals and the society in which they live. These attempts were the origins of modern occupational counseling and vocational guidance. Occupations can be characterized by distinguishable cognitive requirements, and people do have different cognitive ability profiles. You can use education for teaching people to do many things, but we can also discover the cognitive strengths (and weaknesses) of any individual and find which occupations might be most suitable for them.

Huarte asked questions such as: Why are children of the same parents so different? What are the key psychological features of the different professions/occupations? How can we match the wide variety of individuals with the psychological requirements of the professions? How can society promote the development of wits? He considered how different cognitive abilities relate to one another and also how intelligence interacts with treatment (e.g., programs to aid learning complex vs. simple information). Acknowledging this pioneering approach, Douglas Detterman wrote, "Huarte was not only the first to suggest a multifactorial model of intelligence, but also the first to describe aptitude by treatment interactions. . . . Much of what Huarte says sounds strikingly modern. Indeed, his theory contains many of the aspects of current models of intelligence" (Detterman, 1982, pp. 100–101).

1.1.2 *England and France, Nineteenth and Twentieth Centuries*

In the nineteenth century, the Briton Sir Francis Galton (1822–1911) explored Africa, made major contributions to the development of statistics ("whenever you can, count" became his favorite dictum), and conducted research in psychology. He endorsed the theory of evolution proposed by his half cousin Charles Darwin, and he thought that human intelligence was inherited in the same sense as the rest of human traits. He considered that a person's intelligence could be assessed by examining brain size or measuring the efficiency of the nervous system by recording the speed of reaction to elementary signals. He also understood the value of studying twins.

Galton made contributions to several disciplines, not just psychology. Because of his explorations of remote regions in Africa (paying the costs of the expeditions himself), he was elected into the Royal Geographical Society at age thirty-four. He also discovered anticyclones, invented tools for registering weather data, and contributed to the establishment of the Meteorological Office in Britain. In 1890, he persuaded Scotland Yard to use fingerprints for identification purposes. He designed and built the Anthropometric Laboratory for the 1884 London International Exhibition, where he measured thousands of people, getting their heights, weights, physical abilities, and reaction times.

Perhaps his major contribution to psychology was the generalization of Darwin's framework for the scientific study of human mental traits. His cousin had demonstrated that there are widespread individual differences in the physical realm due to evolution processes, so Galton posited there must be individual differences at the mental or psychological level also due to evolution. He adopted Aldolphe Quetelet's bell-shaped curve for quantifying these differences, invented the correlation coefficient to quantify the strength of relationship between two variables, and promoted the use of percentiles for ranking people. In one of his most famous books, *Hereditary Genius* (Galton,

1869), Galton emphasized that eminence ran in families because it was due partly to genetic influences. He coined the term *eugenics* to describe a progressive movement that encouraged more procreation among the upper classes, a view sometimes called positive eugenics. This idea was taken to horrific opposite extremes by the Nazis, who distorted the original concept beyond recognition to include killing or sterilizing people they thought were not worthy of procreation. Ray Fuller's biography of Galton cited this passage about eminence from *Hereditary Genius*: "There is no escape from the conclusion that nature prevails enormously over nurture *when the differences of nurture do not exceed what is commonly found among persons of the same rank of society and in the same country*" (Fuller, 1995, p. 404, emphasis added). In other words, genetic influences (nature) were strongest when environments (nurture) were similar. Galton is often today criticized for his views on eugenics, especially when no positive/negative distinction is made, but Fuller highlighted a more balanced view.

From a different but related perspective, a French experimental psychologist, Alfred Binet (1857–1911), developed the first intelligence tests to be used in schools. In 1903, he published a book, *The Experimental Study of Intelligence*, summarizing his research on intelligence, mainly based on the systematic observation of his two daughters (Binet, 1903). He was aware of Galton's conceptualization of intelligence, but he had another view. Binet's view regarding the measurement of human intelligence has dominated the assessment of intelligence, as we will see.

We will also discuss the contributions of another Briton, Charles Spearman. According to Ian Deary, Huarte's work, "if bound together with (Charles) Spearman's (1927) *The Abilities of Man*, the resulting volume would be a comprehensive review covering the period from antiquity to the establishment of scientific psychology, and would pose almost all the important questions currently being addressed in mental ability differences" (Deary, 2000, pp. 47–48).

1.2 Testing for Intelligence

Society requires methods for selecting candidates either into employment directly or into educational systems that serve as channels to future employment. Not everyone can do whatever they want independent of required ability. Students have to be selected, jobs have to be filled, and when behavioral problems arise, mental competence must be assessed. We often rely on formal testing to accomplish such selections objectively as much as possible to avoid unjustified biases. If you do not like testing, what is your alternative that can do better?

1.2.1 *Testing before Psychological Science*

Modern psychologists did not invent testing. In the early days of the Chinese empire, an elaborate series of local, regional, and nationwide tests were used to select officers for the imperial bureaucracy. Candidates had to write traditional poetry, explain the importance of fearing the will of heaven, and know the words of the sages.

What the Chinese tested, and what we today attempt to evaluate, is a collection of mental traits that we call intelligence or general cognitive ability. These traits define individual differences in abilities and skills with broad application in many settings. Some of the most important aspects of intelligence are the abilities to reason, plan, solve problems, and learn. You demonstrate this by showing that, after exposure to knowledge, you have learned something useful. For example, the skills needed to do well on a college entrance test are not exactly all the skills you need to acquire a bachelor's degree, but there is some overlap of a general factor. That is why both the classic Chinese and modern testing work. It is also why they work imperfectly.

1.2.2 *Alfred Binet Invents Modern Intelligence Testing*

Modern schooling is an unusual form of education. Before 1800, most humans were educated on the job – observing and then

helping adults and serving as apprentices. Universal education, the requirement that every child learn by practicing seemingly esoteric exercises in a setting divorced from everyday life, is a late nineteenth-/early twentieth-century idea.

At the start of the twentieth century, France was committed to providing public education for all its citizens. However, the French Ministry of Education had a problem. The idea of universal public education had been adopted so that all children would have an opportunity to compete for desirable positions in society. Given different backgrounds and abilities, this goal was not easy to achieve.

By 1900, it was apparent to educators that some children had a great deal of trouble learning in this manner. The French educational administration needed a way of identifying such children so that they could either be dropped from the system or channeled into an educational program more suited to their abilities. It was also important to prevent children with behavioral problems instead of academic weakness to be sent to remedial programs by teachers eager to have discipline problems removed from their classrooms.

French educators needed an objective method to evaluate students' potential to learn so the goal of universal education could be achieved. So, from the very first, testing was intended to benefit society as well as individuals. To meet this challenge, the Education Ministry hired Alfred Binet, who began his task by making two assumptions:

1. Mental competence increases over the childhood years. The typical six-year-old can solve problems a four-year-old cannot; a four-year-old can solve problems a two-year-old cannot – and so on, at least from birth to the late teenage years. Therefore, it makes sense to talk about mental age – the level of mental competence at which a child is operating.

   Binet took a pragmatic approach to the measurement of mental age. He asked experienced teachers what sorts of problems children could solve at different ages. Once he had a set of problems typical of what most children could solve at age six, seven, eight, and so on, he could assess a person's mental age by finding the most difficult problems that a child could solve. Mental age could then be compared to chronological age, to determine whether a child has been performing below, at, or above the average cognitive level that would be expected based on chronological age.
2. Binet then made his second assumption: a child's relative standing in mental development, compared to their age group, will remain fairly constant as the child ages. If Claude and Pierre are both six years old, but Claude has a mental age of eight and Pierre has one of five, Binet assumed that four years later, when they were both ten, Claude would have a mental age higher than ten and Pierre a mental age lower than ten.

   Therefore, it follows that if you test children on entrance to school (age six), and you find that some are markedly behind (have mental ages in the three to four range), those children are likely to be behind their classmates at all ages and, therefore, are candidates for removal from the standard school program and entrance to remedial education.

That is just what the French education system wanted to know. The Education Ministry accepted Binet's approach, and the modern era of intelligence testing had begun.

1.2.3 *The Intelligence Quotient (IQ)*

Mental age was a meaningful concept for children since cognitive abilities increase as the brain, and the body itself, is developing. But as mental testing expanded to the evaluation of adolescents and adults with mature brain development, there was a need for a different measure of intelligence. The intelligence quotient (IQ) was born. Originally, IQ referred to mental age divided by chronological age, but it now refers to any

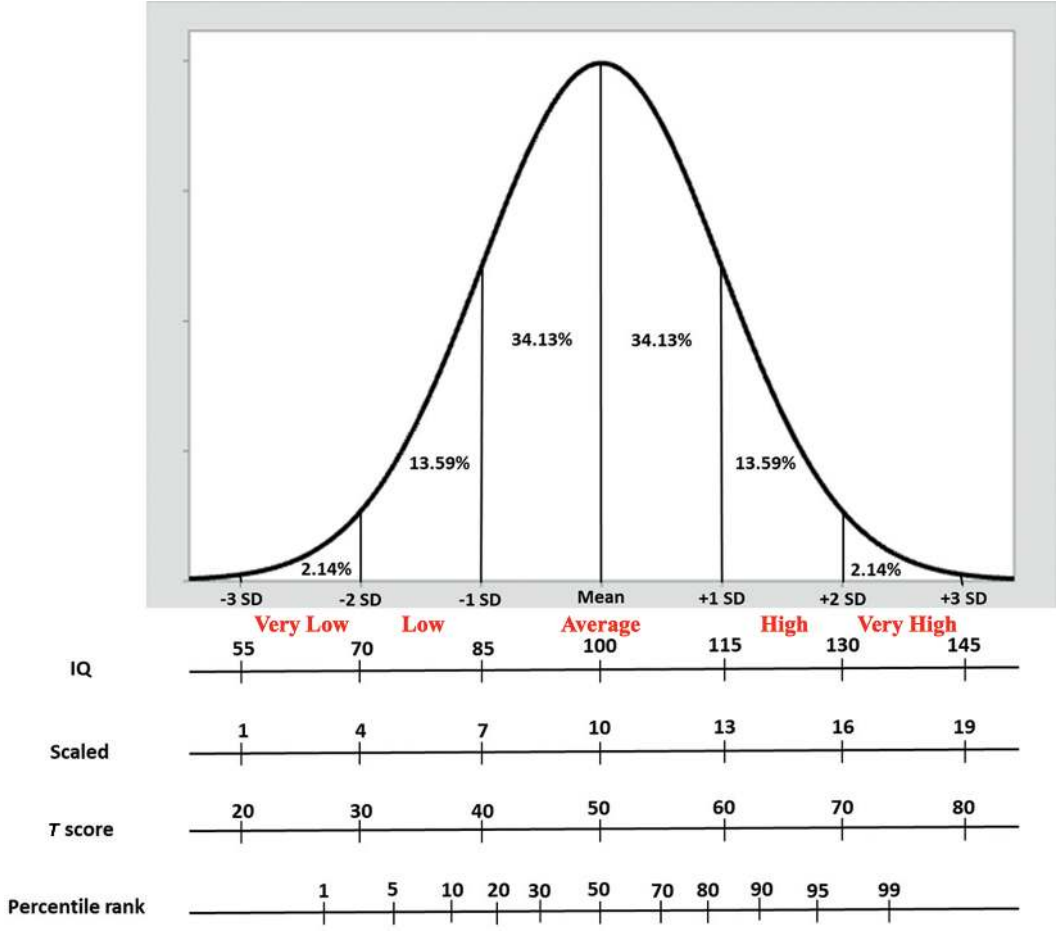

Figure 1.1 The bell curve for IQ. The area under this curve represents 100 percent of the population. The area under the curve and to the left of a given IQ value represents the proportion of people in a population who have IQs lower than the given IQ value. This can be seen in the percentile rank line. Conversely, the area to the right indicates the fraction of people who have this IQ or a higher one. For example, 50 percent of the area under the curve lies to the left of IQ = 100, indicating that half the population has an IQ of less than 100. Just over 68 percent have IQs between 85 and 115. To the right of an IQ of 130 (2 standard deviations above the mean of 100), only 2.14 percent is under the curve, indicating that only 2.14 percent of all people have IQs of 130 or higher (see Table 1.1 for more examples). The bell curve for IQ scores is a special example of the normal, or Gaussian, distribution. Some intelligence tests use scaled scores or a *T* score; both are equivalent to IQ and percentile rank, as shown.

standardized score on an intelligence test. Modern tests have been developed according to a scoring protocol where average intelligence receives a score of 100 and other scores are assigned so that the scores are distributed normally around 100, with a standard deviation of 15 (standard deviation is a measure of the scatter of scores around a mean).

As illustrated in Figure 1.1, in a normal distribution (also called a bell curve, because of its shape), approximately two-thirds of all scores lie between 85 and 115. Five percent of all scores are above 125, and 1 percent are above 135. Similarly, 5 percent are below 75, and 1 percent are below 65. Therefore, IQ, in the narrow sense, is a score indicating a person's relative performance on an intelligence test, compared to the performance of other people in an appropriately chosen comparison group.

Table 1.1 The distributions of standard (z) scores (based on standard deviation units; negative values are below the mean) and IQ scores in terms of the percentage of people above or below selected scores

Standard score (z)	*IQ score*	*% Below*	*% Above*
−2.33	65	0.982	99.018
−2.00	70	2.275	97.725
−1.00	85	15.866	84.134
−0.67	90	25.249	74.751
0.00	100	50.000	50.000
0.67	110	74.751	25.249
1.00	115	84.134	15.866
2.00	130	97.725	2.275
2.33	135	99.018	0.982
3.00	145	99.865	0.135
4.00	160	99.997	0.003

In the broader sense, the term *IQ* often is used as a synonym for intelligence, that is, as a shorthand term for individual differences in cognition. A person who has high intelligence will probably have a high IQ score, but the distinction between the two is important. The use of IQ as synonymous with intelligence causes much confusion and deserves careful consideration.

In interpreting IQ scores, it is often useful to think of percentiles, which indicate the percentage of people in the reference group whose scores are below or above a certain level. What that level is is shown by the IQ score and by the properties of the bell curve itself. Table 1.1 shows examples of reference scores. The properties of these scores follow from the assumption that IQ scores will fit the normal distribution illustrated in Figure 1.1. An IQ of 65 would, if accompanied by other indications of mental competence, be cause for considering a person mentally disabled. If IQ is distributed normally, about 1 percent of all people have IQ scores this low. Average IQ is, by definition, 100. Approximately half of all scores lie between 90 and 110. About 16 percent of the scores lie above 115, 2 percent lie above 130, and 1 percent lie above 135.

MENSA, an international organization whose members have high IQ scores (ninety-eighth percentile plus 2 standard deviations, or IQs greater than 130, is the minimum for membership), defines the even higher 4-sigma group as people with IQs over 160. (*Sigma* is a term frequently used to refer to the standard deviation.) This latter level of score would be expected three times in every 100,000 observations.

If someone says that their child has an IQ of, say, 110, this does not mean that the child's mental age is 10 percent higher than their chronological age or that the child is 10 percent smarter than a child with an IQ of 100. It means that the child has a test score in the top 25 percent of test scores at the child's age.

Why are IQ scores distributed normally? IQ tests are constructed by choosing appropriate numbers of easy, intermediate, and hard cognitive problems or exercises (items). The total scores will be normally distributed in the population for which the test was intended.

There is no interpretation of IQ independent of the tests themselves. IQ scores are used to describe people *relative to each other*. This contrasts with a variable like height of an individual, which is defined independently of the height of other people. Height happens to be distributed approximately normally, within the populations of adult men and women.

The distribution of height is a fact of nature. The fact that IQ test scores are normally distributed is an outcome of the test construction procedure. Nevertheless, despite limitations, test scores are a reasonable and useful way to quantify differences among people. Importantly, these cognitive differences exist regardless of their formal measurement by IQ tests, which provide an excellent quantification of these cognitive differences; the former does not create the latter.

IQ scores are also used to make predictions and to indicate associations, as in

predicting a student's likely academic progress or investigating the association between intelligence and income differences. There are technical reasons for wanting to deal with normally distributed scores when we apply the statistical methods used for making predictions and analyzing associations, as discussed at length in later chapters.

There is another, less technical reason for requiring that IQ scores be normally distributed. Many other human factors that can be measured on scales with physical interpretations, like height and weight, are distributed normally. If we could measure intelligence in some physical manner, such as measuring the efficiency of the nervous system, the number of neurons, or the integrity of white matter connections in the brain, these measures would likely turn out to be normally distributed. Therefore, it seems appropriate to require that IQ scores be normally distributed.

In the late nineteenth and early twentieth centuries, this reasoning seemed compelling, because the normal distribution itself was regarded as a law of nature. Today, there is still a good argument for assuming a normal distribution. If a person's intelligence is due to a large number of causes, each of which has a small effect, intelligence would be distributed normally across the population. In fact, as explained in Chapter 6, a large number of genes, each with small effects, apparently contribute to intelligence differences.

Binet's assumption that mental competence increases as children grow older was correct. He was also correct that there are marked individual differences in the rate at which mental competence increases across age. His second assumption was that relative standings remain constant as children age. This is true on the whole, although there are some exceptions. The smartest kid in grade school does not always become a Phi Beta Kappa in college or a wealthy CEO. However, after the age of about ten, indicators of relative cognitive competence are fairly stable. Stable refers to a person's rank in a group ranked by IQ scores. Even though scores change over time, the rank does not change much. The smartest eleven-year-olds will tend to be the smartest eighteen-year-olds. Variance (individual differences in cognitive ability) and mean levels (average cognitive ability) tell different stories, and it is extremely important to keep this in mind. The same happens with height: on average, eighteen-year-olds are taller than eleven-year-olds, but the tallest eleven-year-old will tend to be the tallest eighteen-year-old. The rank ordering over time allows estimating stability values in a given physical or psychological trait.

Evidence for the stability of intelligence is demonstrated in a countrywide study of Scottish schoolchildren, coordinated by Ian Deary (more details of this classic study are in Section 1.3.1). There were substantial correlations between intelligence test scores taken at age eleven and subsequent measures taken when the examinees were in their sixties and seventies, even though the average scores were higher in the older adults (Deary, 2014). Based on this and similar studies, most researchers regard intelligence as a *trait*, a characteristic of the individual that is stable over time and that is revealed in many situations.

1.2.4 *The Stanford–Binet and Wechsler Tests*

Lewis Terman, from Stanford University, translated and modified Binet's tests for use in the United States of America. The resulting test, the Stanford–Binet Intelligence Test, is still used today in updated form (SB-5). The Binet and Stanford–Binet tests were intended for use with schoolchildren. In the late 1930s, David Wechsler, a clinical psychologist working at New York City's Bellevue Hospital, created a similar test for adults, the Wechsler–Bellevue test. It has subsequently been modified into the Wechsler Adult Intelligence Scale (WAIS). It and a companion test for children, the Wechsler Intelligence Scale for Children (WISC), are the most widely individually administered intelligence tests today.

Both the Wechsler and the Stanford–Binet tests are individually administered. The examinee sits down with a trained examiner and attempts to solve a series of problems, divided pragmatically into problems that vary in the

demands that they place on language and memory. Wechsler has described this as an opportunity for the examinees to display their cognitive abilities and skills during a standardized interview with an experienced observer.

The resulting IQ scores have proven to be highly useful in many domains (see Chapter 8 for details). For instance, the WAIS is widely used to evaluate a person who, for whatever reason, is of suspected mental disability. Examples of such use are the adjudication of legal competence and the analysis of status following brain injury.

Other applications of these tests for individuals are extensions of these ideas. The cost of testing is evaluated relative to the potential benefits of the results in making judgments about an individual case. Are the decisions made about this person improved by knowing test scores, and if they are, is the value of a typical decision enough to justify the costs of the test (see Box 1.1 and Chapter 8)? The Wechsler and Stanford–Binet tests are not the only individually administered intelligence tests, but they have played an important role in the development of testing for intelligence.

1.2.5 *Group Testing*

The next major step in intelligence testing was a spin-off from a critical military need. When the United States entered World War I, the army had to make rapid evaluations of mental abilities of large numbers of incoming soldiers to help direct them into appropriate specialties, as was Huarte's goal noted earlier. The War Department sponsored development of a test that could be administered to large groups of recruits. Psychologists responded by developing the Army Alpha Test, a written test suitable for group administration, and the Beta test, a version which could be given to recruits who could not read.

The military tests are examples of successful personnel classification tests. Today,

Box 1.1 Is There Any Value in Knowing Your IQ?

Arthur Jensen, known for his pioneering studies of intelligence, discussed IQ testing on the *Phil Donahue* television talk show more than forty years ago. He received hundreds of letters with questions from viewers. In his book *Straight Talk about Mental Tests* (Jensen, 1981), chapter 7 was devoted to addressing some of these questions. Regarding whether it is important to know your own IQ, Jensen answered in part, "I can do what I try to do, with some effort, and I don't believe that knowing my IQ would ever have been of any use to me in the process of trying to achieve any of my goals. . . . The best way to find out if you can achieve something is to try to achieve it. No person should approach a challenge as a statistic to be predicted by a test score in a regression equation." In other words, it is not generally important to know your own IQ.

Here are some other interesting questions from the 1980s and Jensen's answers from his chapter 7 (they presage chapters later in this book):

Question: If group IQ tests are abandoned by the public school, what would take their place [note that group IQ testing used to be common in public schools, although this is no longer true]?

Answer (in part): Schools should focus on achievement instead of on the measurement of cognitive abilities. The exception is when students show unusual learning problems that require attention by qualified psychologists. . . . The aim of IQ tests is not measuring specific skills and knowledge, but the general cognitive ability underlying observable performance. [See more about this general ability in our Chapter 3.]

Box 1.1 *(continued)*

Question: What can I do to raise my child's IQ [intelligence]?
Answer (in part): I don't know of any psychological prescription that will lead to the fulfillment of this parental wish. No such formula has been discovered. [This is still the case, as explained in our Chapter 13.]
Question: Isn't there a danger that scientific knowledge about such subjects as genetics, intelligence, and race might be misused by racists?
Answer: The place to stop the misuse of knowledge is not at the point of inquiry, but at the point of misuse. To avoid pursuing scientific inquiry for fear that racists will misuse it is to grant them the power of censorship of research. ... Already well-established findings in genetics [see our Chapter 6] and differential psychology clearly contradict the essential tenets of racism. ... The sound use and interpretation of mental testing can help reinforce the democratic ideal of treating every person according to his or her individual characteristics, rather than according to race, sex, social class, religion, or national origin. [See more in our Chapters 9 and 12.]

Jensen's views are widely accepted among today's intelligence researchers. More of Jensen's work will be discussed in Chapters 3, 7, and 13.

cognitive tests for personnel classification are widely used in the civilian sector as well as in the military (we present supporting data in Chapter 8). The costs and benefits of testing within a personnel classification system are not the same as the costs and benefits of testing intended for individual counseling and/or placement.

In a personnel classification system, correct classifications have a value and incorrect classifications have a cost, as seen from the perspective of the institution setting the test, rather than as seen from the perspective of the examinee. A classification test is economical if, on average, the cost of administering the test is less than the value of improved decision-making. This view shifts the focus from decisions about an individual to the average value of a decision, calculated over the population. The shift greatly affects the economics of testing. A cheap test, which makes only a moderate improvement in the accuracy of the selection decisions, administered to thousands or even millions of people, can be a valuable classification instrument.

Well over a hundred group-administered classification tests have been developed. They include the Scholastic Ability Test (SAT) used in the college admissions process in the United States and the General Aptitude Test Battery (GATB), which for years was used by the US Department of Labor to provide a test score to guide in industrial hiring.

Describing all the tests in use today literally takes a volume, and the volume has to be updated annually. We discuss more details of using tests for selection in Chapter 8. If you are interested in traveling more through this rich forest, you can visit the highly recommended web page of the International Test Commission (www.intestcom.org).

The important point is that since the 1930s, intelligence testing has been widely used to make important decisions about academic and vocational careers (Detterman, 2014). Testing is also used as a guide in medical rehabilitation, such as evaluating the course of treatment following insults to the brain. The tests are also widely used in research on the description, causes, and consequences of being more or less intelligent, as we shall see throughout the rest of this book.