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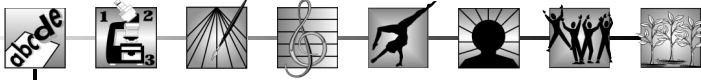
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Introduction

Think about the last time you went to a party or function in a new environment or with a number of people you had not met before. What impressions stayed with you when you left? Do you remember the arrangement of the furniture, the decor, the clothes that people were wearing or the colour scheme of the room? Or did you hum the music that played that night? Perhaps you noticed that two of your friends were obviously in conflict, judging by their body language. Do you remember the food you ate or the precise order of events? Alternatively, you may remember entire conversations and be able to replay them in your head weeks after the event.

Similarly, if you were asked to solve a problem such as how many rolls of wallpaper it would take to cover your dining room, you may choose one of several alternatives. You may sit down with pen and paper and calculate the room's and the wallpaper's measurements to make your decision. You may consult a book or ask an expert. Others may simply buy the wallpaper as they need it while they paper the room. Still others may employ somebody to complete the job for them.

These are just two examples of the different ways that people can function in response to the many activities, tasks and challenges in their daily lives. They may also indicate different ways of thinking and knowing the world.

In 1983, a Harvard psychologist named Howard Gardner wrote a book that is revolutionising education in the United States and is currently gaining momentum in Australia. The book, *Frames of Mind*, explicated Gardner's theory of multiple intelligences, a theory that suggests that all people possess not one but at least seven intelligences. Since the book was first published, Gardner has added an eighth intelligence to his theory.

To illustrate the distinctions between the eight intelligences, consider the Australians listed in the margin and attempt to decide which one of them is the most intelligent.

Any attempt to answer soon highlights the impossibility and nonsense of such a question. These eight individuals not only lived at different times in Australia's history but have accomplished in very different fields of endeavour. Even within the broad field of literature, it is difficult – if not impossible – to compare the poetry of Oodgeroo Noonuccal with the novels of David Malouf. The eight individuals, like all of us, have very different intellectual profiles that have led to different attainments. In Gardner's terms, these individuals have differing blends of the eight intelligences. Therefore, with Gardner, we would contend that 'Who is the most intelligent?' is the wrong question to ask, particularly for educators. We are much better served – and so are our children – by questions such as 'How am I intelligent?' and 'In what ways may I become more intelligent?'. These questions are more properly the concern of educators.

Who is the most intelligent?

Blessed Mary MacKillop, nun

David Malouf, author

Joan Sutherland, opera singer

Albert Namatjira, artist

Cathy Freeman, athlete

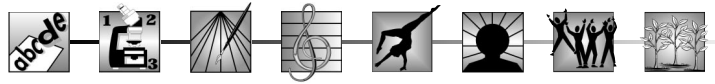
William Farrar, biologist

Oodgeroo Noonuccal, poet

Marc Oliphant, scientist

Historical Perspectives on Intelligence

Before we explore Gardner's notions of intelligence any further, it would be useful to briefly consider the history of intelligence and its measurement. As with many areas of psychology, it is possible to trace back current ideas to the Ancient Greek philosophers. In the case of intelligence, Plato is among the first to comment on the intellectual differences among people. Plato concluded that the differences that could be observed among people – primarily on the basis of race, class or sex – could be attributed to inherited differences. While Plato's rhetoric argued for a meritocratic system of advancement, the reality was that the best and brightest in that society – Plato's 'men of gold' – were inevitably drawn from the wealthy patrician classes. Thus, for Plato and others of that era, one's level of intelligence was an inborn characteristic. The notion of a high proportion of genetic inheritance is still supported in many quarters today, despite evidence that challenges such assumptions.



An enlightened person cannot think of measuring intelligence by measuring the brain

(Oxford Companion to the Mind, 1987, p. 119)

Despite this modern exhortation, one of the first attempts to measure the capacity of the brain was undertaken by the phrenologists of the 18th and 19th centuries. Scientists such as Franz Joseph Gall and Johann Spurzheim hypothesised that the capacity of the mind was directly related to physical brain function. They attempted, therefore, to localise and map brain function by observing and measuring the bumps on the human skull. While such an approach to the measurement of intelligence may seem ludicrous today, there are still serious scientific attempts to localise brain functions, albeit with more sophisticated approaches.

The relationship between physical and mental capacities, and the inheritability of intelligence are both themes that are reflected in the work of Francis Galton in the late 19th century. A cousin of Charles Darwin, Galton noted the tendency of genius to run in families. He concluded from this observation that intelligence was inherited, an idea which he developed in his publication, *Hereditary Genius*. With a firm belief in the inherited nature of intelligence and a desire to promote a more intellectual society, Galton was one of the founding fathers of the Eugenics movement which advocated the sterilisation of those of 'subnormal' intelligence. It was therefore essential that tests be devised that could distinguish differing levels of intelligence. Galton suggested the use of anthropometric tests to measure intelligence. These included the following:

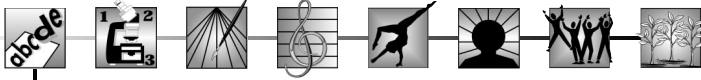
- keenness of vision and hearing
- dynamometric pressure (that is, a measure of force expended by an individual or muscular strength)
- reaction time
- word association, and others

Similarly, James McKeen Cattell devised mental tests that included measures of strength, reaction time and sensory discrimination.

The critical moment in intelligence testing, though, came in the work of Alfred Binet and Théophile Simon at the turn of the century. Binet and Simon had been approached by the French government to devise a test that would discover which children would require extra help at school. Binet theorised that children learned from their cultural environment and that their familiarity with particular materials would enhance intellectual functioning. Thus, Binet did not view intelligence as an inborn characteristic nor did he see his measurements as a method for ranking students. The tests that were included in the Binet–Simon battery attempted to measure superior faculties and included the following:

Binet theorised that children learned from their cultural environment and that their familiarity with particular materials would enhance intellectual functioning.

- memory
- the nature of mental images
- imagination
- attention
- comprehension
- suggestibility
- aesthetic feeling
- moral feelings
- muscular strength and will power
- motor skill and perceptual skill in spatial relations



Binet and Simon developed the concept of mental age to indicate the relationship between an individual's mental capacities as shown on their test and their chronological age. Thus, a ten-year-old child who was operating at the mental level of the majority of twelve-year-olds in responding to the test would be considered to have a mental age of twelve.

There were numerous translations of the Binet–Simon scales in the United States in the early part of the twentieth century, but the adaptation by Lewis Terman has probably made the most significant impact in intelligence testing to date. Like Galton, Terman was a staunch believer in the inheritability of intelligence and a keen supporter of the Eugenics movement. In his hands, the Americanisation of the Binet–Simon test came to reflect these beliefs, contrary to their originators' beliefs. The Stanford–Binet, as it became known because of Terman's location at Stanford University, remains among the most highly regarded and widely used test of intelligence. The development of the Stanford–Binet and the later tests of David Wechsler saw the introduction of Intelligence Quotient (IQ) into the language of testing. Initially, IQ was calculated by dividing one's Mental Age (MA) – as measured by the test – with one's Chronological Age (CA) and multiplying by 100. Therefore, a person whose Mental Age perfectly matched their Chronological Age would have an IQ score of 100, while those with lower MAs than the norm would score below 100 and those with higher MAs would correspondingly score above 100. IQ scores and their theoretical distribution in the population are illustrated in figure 1.1.

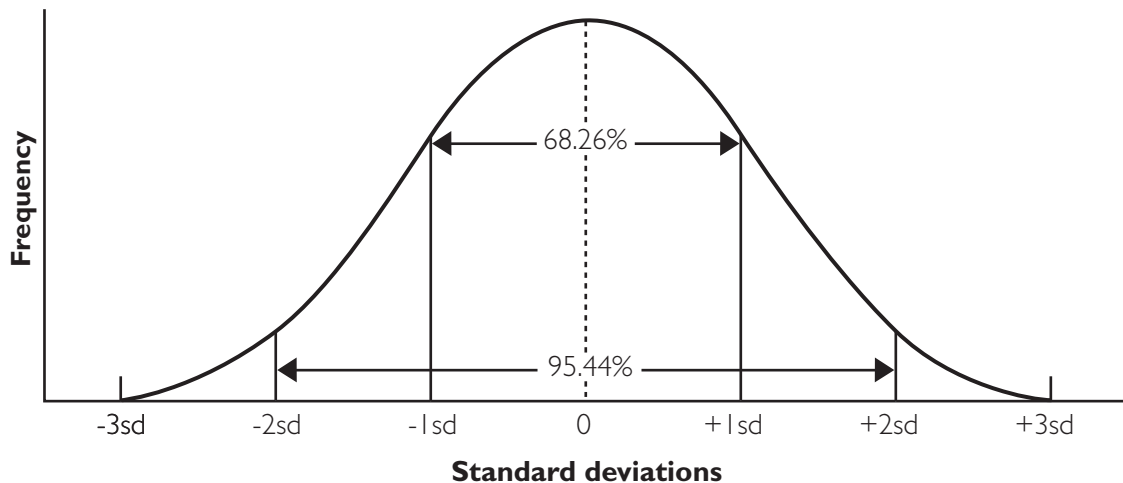


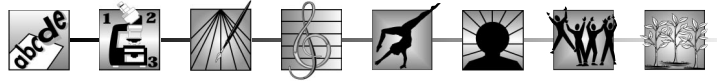
Figure 1.1 The Bell Curve

Although the Bell curve, as it is known, is a statistical artefact based on theoretical distributions in the population at large, it has often been misused through its application to smaller samples of people. The misuse applies when a discrete group is forced to fit into the theoretical distribution pattern illustrated. We can recall assessment practices based on this principle from our own experiences as students. To apply a Bell curve to a class of thirty students is ludicrous not only because a class of similarly aged children from a particular environment is not a true reflection of the larger population but also because it results in fifty per cent of the class failing in the sense that they fall below the mean score.

Since the development of the Stanford–Binet, controversy has surrounded the IQ test primarily because of differences in the scores gained by particular cultural groups.

Since the development of the Stanford–Binet, controversy has surrounded the IQ test primarily because of differences in the scores gained by particular cultural groups. For example, black Americans consistently score one standard deviation (approximately 15 IQ points) below their white counterparts. Terman had noted such differences and concluded that 'Latin' and 'Negro' races were inferior in intelligence to white races. Understandably, such conclusions caused a racial furore that has never really disappeared, as

some academics, such as Arthur Jensen and William Shockley in the 1960s and 1970s, continued to fan the flames with their support of a high genetic contribution to intelligence. The debate has resurfaced with the recent release of Herrnstein and Murray's book, *The Bell Curve: Intelligence and Class Structure*



in American Life (1994), in which the authors argue that intelligence is predominantly genetic. Throughout the century, there have been numerous academics who have vigorously attacked the racist conclusions of Terman and his successors. In particular, Stephen Jay Gould's book, *The Mismeasure of Man* (1981), provides a scholarly and thorough critique of the assumptions inherent in the intelligence testing movement.

In summary, then, much of the controversy surrounding IQ tests resides in the assumption that intelligence is a unitary, measurable quality, inherited from one's forebears, that resides in a person's head and that can be captured in a number. Developments from the middle of this century have centred on this question of the singularity or plurality of intelligence. Charles Spearman (1929), for example, argued that intelligence could be divided into a general factor – termed *g* – and specific factors – termed *s*. The *g* specifies the abstract reasoning power a person has and is consistent across all domains while *s* explains differences in performance in different activities.

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Subsequently, Louis Thurstone (1938) proposed that intelligence was not unitary but multidimensional. He believed that the allocation of a single number to intelligence could mask the intellectual strengths and weaknesses of children, many of which were independent of each other. Based on close analyses of test results, Thurstone concluded that intelligence was comprised of seven relatively independent capacities which he termed the seven 'primary mental abilities' and which entailed the following:

- verbal comprehension
- number ability
- word fluency
- spatial visualisation
- associative memory
- reasoning
- perceptual speed

Probably the most extreme example of the pluralistic nature of intelligence is captured by J. P. Guilford's model which he has entitled the 'Structure-of-Intellect' model (1967). Guilford hypothesised that intelligence may be classified into three dimensions, each of which has a number of components, as illustrated below. The three dimensions are:

1. mental operations
2. contents
3. products resulting from mental operation