

Cambridge University Press
0521802385 - Wisdom, Intelligence, and Creativity Synthesized
Robert J. Sternberg
Excerpt
[More information](#)

PART I

INTELLIGENCE

1

Background Work on Intelligence

In the year 2000, Al Gore ran against George W. Bush for the presidency of the United States. Both candidates had highly successful political careers, Gore as a U.S. senator from the state of Tennessee and as vice-president of the United States, Bush as governor of the state of Texas, certainly one of the most complex states in the United States. Their success in politics was not preceded by success in school (Simon, 2000). Both men were mediocre students in college. In four years at Yale University, Bush never received an A, and Gore’s grades at Harvard were even lower than Bush’s at Yale. During his sophomore year, Gore received one B, two Cs, and a D (on a scale where A is high and D is the lowest passing grade). Their college admission test scores were also undistinguished. Gore received a 625 on the verbal SAT (on a scale where 200 is low, 500 average, and 800 high, and where the standard deviation is 100 points). Bush received a score of 566. Bill Bradley, a former U.S. senator and a Democratic presidential primary candidate, received an even less impressive score of 485.

Are these famous politicians unintelligent, intelligent in some way not measured by conventional tests, or what? What does it mean to be intelligent, anyway, and how does our understanding of the nature of intelligence help us understand concrete cases such as Bradley, Bush, and Gore?

CONCEPTIONS OF THE NATURE OF INTELLIGENCE

Anyone who has seriously studied the history of the United States or of any other country knows that there is not one history of a country but many histories. The history of the United States as told by some American Indians, for example, would look quite different from the history as told by some of the later settlers, and even within these groups, the stories would differ. Similarly, there is no one history of the field of intelligence, but

Cambridge University Press

0521802385 - Wisdom, Intelligence, and Creativity Synthesized

Robert J. Sternberg

Excerpt

[More information](#)

rather, many histories, depending on who is doing the telling. For example, the largely laudatory histories recounted by Carroll (1982, 1993), Herrnstein and Murray (1994), and Jensen (1998, 2002) read very differently from the largely skeptical histories recounted by Gardner (1983, 1999), Gould (1981) or Sacks (1999). And there are differences within these groups of authors.

These differences need mentioning because, although all fields of psychology are perceived through ideological lenses, few fields seem to have lenses with so many colors and, some might argue, with so many different distorting imperfections as do the lenses through which are seen the field of intelligence. The different views come not only from ideological biases affecting what is said, but also from affecting what is included. For example, there is virtually no overlap in the historical data used by Carroll (1993) and those used by Gardner (1983) to support their respective theories of intelligence.

Although no account can be truly value-free, I try in this chapter to clarify values in three ways. First, I attempt to represent the views of the investigators and their times in presenting the history of the field. Second, I critique this past work, but make my own personal opinions clear by labeling evaluative sections "Evaluation." Third, I try to represent multiple points of view in a dialectical fashion (Hegel, 1807/1931; see Sternberg, 1999a), pointing out both the positive and negative sides of various contributions. This representation recognizes that all points of view taken in the past can be viewed, with "20/20 hindsight," as skewed, in much the same way that present points of view will be viewed as skewed in the future. A dialectical form of examination will serve as the basis for the entire chapter. The basic idea is that important ideas, good or bad, eventually serve as the springboard for other new ideas that grow out of unions of past ideas that may once have seemed incompatible.

The emphasis in this chapter is on the background history of the field of intelligence, particularly with reference to theories of intelligence. Readers interested primarily in measurement issues might consult relevant chapters in Sternberg (1982, 1994b, 2000b).

Perhaps the most fundamental dialectic in the field of intelligence arises from the question of how we should conceive of intelligence. Several different positions have been staked out (Sternberg, 1990a). Many of the differences in ideology that arise in accounts of the history of the field of intelligence arise from differences in the model of intelligence to which an investigator adheres. To understand the history of the field of intelligence, one must understand the alternative epistemological models that can give rise to the concept of intelligence. But before addressing these models, consider simply the question of how psychologists in the field of intelligence have defined the construct on which they base their models.

Expert Opinions on the Nature of Intelligence

Historically, one of the most important approaches to figuring out what intelligence is has relied on the opinions of experts. Such opinions are sometimes referred to as *implicit theories*, to distinguish them from the more formal *explicit theories* that serve as the bases for scientific hypotheses and subsequent data collections.

Implicit theories (which can be those of laypersons as well as experts) are important to the history of a field for at least three reasons (Sternberg, Conway, Ketron, & Bernstein, 1981). First, experts' implicit theories are typically what give rise to their explicit theories. Second, much of the history of intelligence research and practice is much more closely based on implicit theories than it is on formal theories. Most of the intelligence tests that have been used, for example, are based more on the opinions of their creators as to what intelligence is than on formal theories. Third, people's everyday judgments of each other's intelligence always have been and continue to be much more strongly guided by their implicit theories of intelligence than by any explicit theories.

Intelligence Operationally Defined. E. G. Boring (1923), in an article in the *New Republic*, proposed that intelligence is what the tests of intelligence test. Boring did not believe that this operational definition was the end of the line for understanding intelligence. On the contrary, he saw it as a "narrow definition, but a point of departure for a rigorous discussion . . . until further scientific discussion allows us to extend [it]" (p. 35). Nevertheless, many psychologists and especially testers and interpreters of tests of intelligence have adopted this definition or something similar to it.

From a scientific point of view, the definition is problematic. First, the definition is circular: It defines intelligence in terms of what intelligence tests test, but what the tests test can only be determined by one's definition of intelligence. Second, the definition legitimates rather than calling into scientific question whatever operations are in use at a given time to measure intelligence. To the extent that the goal of science is to disconfirm existing scientific views (Popper, 1959), such a definition will not be useful. Third, the definition assumes that what intelligence tests test is uniform. But this is not the case. Although tests of intelligence tend to correlate positively with each other (the so-called *positive manifold* first noted by Spearman, 1904), such correlations are far from perfect, even controlling for unreliability. Thus, what intelligence tests test is not just one uniform thing. Moreover, even the most ardent proponents of a general factor of intelligence (a single element common to all of these tests) acknowledge there is more to intelligence than just the general factor.

The 1921 Symposium. Probably the best-known study of experts' definitions of intelligence was one done by the editors of the *Journal of Educational*

Cambridge University Press

0521802385 - Wisdom, Intelligence, and Creativity Synthesized

Robert J. Sternberg

Excerpt

[More information](#)

Psychology ("Intelligence and its measurement," 1921). Contributors to the symposium were asked to address two issues: (a) what they conceived intelligence to be and how it best could be measured by group tests, and (b) what the most crucial next steps would be in research. Fourteen experts gave their views on the nature of intelligence, with such definitions as the following:

1. the power of good responses from the point of view of truth or facts (E. L. Thorndike)
2. the ability to carry on abstract thinking (L. M. Terman)
3. sensory capacity, capacity for perceptual recognition, quickness, range or flexibility of association, facility and imagination, span of attention, quickness or alertness in response (F. N. Freeman)
4. having learned or ability to learn to adjust oneself to the environment (S. S. Colvin)
5. ability to adapt oneself adequately to relatively new situations in life (R. Pintner)
6. the capacity for knowledge and knowledge possessed (B. A. C. Henmon)
7. a biological mechanism by which the effects of a complexity of stimuli are brought together and given a somewhat unified effect in behavior (J. Peterson)
8. the capacity to inhibit an instinctive adjustment, the capacity to redefine the inhibited instinctive adjustment in the light of imaginably experienced trial and error, and the capacity to realize the modified instinctive adjustment in overt behavior to the advantage of the individual as a social animal (L. L. Thurstone)
9. the capacity to acquire capacity (H. Woodrow)
10. the capacity to learn or to profit by experience (W. F. Dearborn)
11. sensation, perception, association, memory, imagination, discrimination, judgment, and reasoning (N. E. Haggerty)

Others of the contributors to the symposium did not provide clear definitions of intelligence but rather concentrated on how to test it. B. Ruml refused to present a definition of intelligence, arguing that not enough was known about the concept. S. L. Pressey described himself as uninterested in the question, although he became well known for his tests of intelligence.

There have been many definitions of intelligence since those presented in the *Journal* symposium, and an essay has been written on the nature of definitions of intelligence (Miles, 1957). One well-known set of definitions was published in 1986 as an explicit follow-up to the 1921 symposium (Sternberg & Detterman, 1986).

Sternberg and Berg (1986) attempted a comparison of the views of experts (P. Baltes, J. Baron, J. Berry, A. Brown & J. Campione, E. Butterfield, J. Carroll, J. P. Das, D. Detterman, W. Estes, H. Eysenck, H. Gardner,

Cambridge University Press

0521802385 - Wisdom, Intelligence, and Creativity Synthesized

Robert J. Sternberg

Excerpt

[More information](#)*Background Work on Intelligence*

7

R. Glaser, J. Goodnow, J. Horn, L. Humphreys, E. Hunt, A. Jensen, J. Pellegrino, R. Schank, R. Snow, R. Sternberg, E. Zigler) with those of the experts in 1921. They reached three general conclusions.

First, there was at least some general agreement across the two symposia regarding the nature of intelligence. When attributes were listed for frequency of mention in the two symposia, the correlation was .50, indicating moderate overlap. Attributes such as adaptation to the environment, basic mental processes, higher order thinking (e.g., reasoning, problem solving, and decision making) were prominent in both symposia.

Second, central themes occurred in both symposia. One theme was the one versus the many: Is intelligence one thing or is it multiple things? How broadly should intelligence be defined? What should be the respective roles of biological versus behavioral attributes in seeking an understanding of intelligence?

Third, despite the similarities in views over the sixty-five years, some salient differences could also be found. Metacognition – conceived of as both knowledge about and control of cognition – played a prominent role in the 1986 symposium but virtually no role at all in 1921. The later symposium also placed a greater emphasis on the role of knowledge and the interaction of mental processes with this knowledge.

Lay Conceptions of Intelligence

In some cases, Western notions about intelligence are not shared by other cultures. For example, the Western emphasis on speed of mental processing (Sternberg, Conway, Ketrone, & Bernstein, 1981) is not shared by many cultures. Other cultures may even be suspicious of the quality of work that is done very quickly. They emphasize depth rather than speed of processing. They are not alone: Some prominent Western theorists have pointed out the importance of depth of processing for full command of material (e.g., Craik & Lockhart, 1972).

Yang and Sternberg (1997a) have reviewed Chinese philosophical conceptions of intelligence. The Confucian perspective emphasizes the characteristic of benevolence and of doing what is right. As in the Western notion, the intelligent person spends a great deal of effort in learning, enjoys learning, and persists in lifelong learning with a great deal of enthusiasm. The Taoist tradition, in contrast, emphasizes the importance of humility, freedom from conventional standards of judgment, and full knowledge of oneself as well as of external conditions.

The differences between Eastern and Western conceptions of intelligence have extended beyond ancient times and persist even in the present day. Yang and Sternberg (1997b) studied contemporary Taiwanese Chinese conceptions of intelligence, and found five factors underlying these conceptions: (a) a general cognitive factor, much like the *g* factor in conventional

Cambridge University Press

0521802385 - Wisdom, Intelligence, and Creativity Synthesized

Robert J. Sternberg

Excerpt

[More information](#)

Western tests; (b) interpersonal intelligence; (c) intrapersonal intelligence; (d) intellectual self-assertion; and (d) intellectual self-effacement. In a related study but with different results, Chen (1994) found three factors underlying Chinese conceptualizations of intelligence: nonverbal reasoning ability, verbal reasoning ability, and rote memory. The difference may be due to different subpopulations of Chinese, to differences in methodology, or to differences in when the studies were done.

The factors uncovered in both studies differ substantially from those identified in U.S. people's conceptions of intelligence by Sternberg, Conway, Ketron, and Bernstein (1981) – (a) practical problem solving, (b) verbal ability, and (c) social competence – although in both cases, people's implicit theories of intelligence seem to go quite far beyond what conventional psychometric intelligence tests measure. Comparing the Chen (1994) study to the Sternberg and colleagues (1981) study simultaneously naturally must take into account both language and culture.

Chen and Chen (1988) considered only language. They explicitly compared the concepts of intelligence of Chinese graduates from Chinese-language versus English-language schools in Hong Kong. They found that both groups considered nonverbal reasoning skills as the most relevant skill for measuring intelligence. Verbal reasoning and social skills came next, and then numerical skill. Memory was seen as least important. The Chinese-language-schooled group, however, tended to rate verbal skills as less important than did the English-language-schooled group. Moreover, in an earlier study, Chen, Braithwaite, and Huang (1982) found that Chinese students viewed memory for facts as important for intelligence, whereas Australian students viewed these skills as of only trivial importance.

Das (1994), reviewing Eastern notions of intelligence, has suggested that in Buddhist and Hindu philosophies, intelligence involves waking up, noticing, recognizing, understanding, and comprehending, but also includes such things as determination, mental effort, and even feelings and opinions in addition to more intellectual elements.

Differences between cultures in conceptions of intelligence have been recognized for some time. Gill and Keats (1980) noted that Australian university students value academic skills and the ability to adapt to new events as critical to intelligence, whereas Malay students value practical skills, as well as speed (which is more typical of the West than of the East) and creativity. Dasen (1984) found Malay students to emphasize both social and cognitive attributes in their conceptions of intelligence.

The differences between East and West may be due to differences in the kinds of skills valued by the two kinds of cultures (Srivastava & Misra, 1996). Western cultures and their schools emphasize what might be called “technological intelligence” (Mundy-Castle, 1974), and so things like artificial intelligence and so-called smart bombs are viewed, in some sense, as intelligent.

Cambridge University Press

0521802385 - Wisdom, Intelligence, and Creativity Synthesized

Robert J. Sternberg

Excerpt

[More information](#)*Background Work on Intelligence*

9

Western schooling also emphasizes other factors (Srivastava & Misra, 1996), such as generalization, or going beyond the information given (Connolly & Bruner, 1974; Goodnow, 1976), speed (Sternberg, 1985a), minimal moves to a solution (Newell & Simon, 1972), and creative thinking (Goodnow, 1976). Moreover, silence is interpreted as a lack of knowledge (Irvine, 1978). In contrast, the Wolof tribe in Africa views people of higher social class and distinction as speaking less (Irvine, 1978). This difference between the Wolof and Western notions suggests the usefulness of looking at African notions of intelligence as a possible contrast to those of the United States.

Studies in Africa in fact provide yet another window on the substantial differences. Ruzgis and Grigorenko (1994) have argued that, in Africa, conceptions of intelligence revolve largely around skills that help to facilitate and maintain harmonious and stable intergroup relations; intra-group relations are probably equally important and at times more so. For example, Serpell (1974, 1982, 1996) found that Chewa adults in Zambia emphasize social responsibilities, cooperativeness, and obedience as important to intelligence; intelligent children are expected to be respectful of adults. Kenyan parents also emphasize responsible participation in family and social life as important aspects of intelligence (Super & Harkness, 1982, 1986, 1993). In Zimbabwe, the word for intelligence, *ngware*, actually means to be prudent and cautious, particularly in social relationships. Among the Baoule, service to the family and community and politeness toward and respect for elders are seen as key to intelligence (Dasen, 1984).

Similar emphasis on social aspects of intelligence has been found as well among two other African groups – the Songhay of Mali and the Samia of Kenya (Putnam & Kilbride, 1980). The Yoruba, another African tribe, emphasize the importance of depth – of listening rather than just talking – to intelligence, and of being able to see all aspects of an issue and to place the issue in its proper overall context (Durojaiye, 1993).

The emphasis on the social aspects of intelligence is not limited to African cultures. Notions of intelligence in many Asian cultures also emphasize the social aspect more than does the conventional Western or IQ-based view (Azuma & Kashiwagi, 1987; Lutz, 1985; Poole, 1985; White, 1985).

It should be noted that neither Africans nor Asians emphasize exclusively social notions of intelligence. Although their conceptions much more emphasize social skills than do the conventional U.S. ideas, at the same time they recognize the importance of cognitive aspects of intelligence. In a study of Kenyan conceptions of intelligence (Grigorenko et al., 2001), it was found that there are four distinct terms constituting conceptions of intelligence among rural Kenyans, *rieko* (knowledge and skills), *luoro* (respect), *winjo* (comprehension of how to handle real-life problems), and *paro*

(initiative), with only the first directly referring to knowledge-based skills (including but not limited to the academic).

It is important to recognize that there is no one overall U.S. conception of intelligence. Indeed, Okagaki and Sternberg (1993) found that different ethnic groups in San Jose, California, had rather different conceptions of what it means to be intelligent. Latino parents of schoolchildren tended to emphasize the importance of social-competence skills in their conceptions, whereas Asian parents tended rather heavily to emphasize the importance of cognitive skills. Anglo parents also emphasized cognitive skills. Teachers, representing the dominant culture, more emphasized cognitive than social-competence skills. The rank order of performance among children of various groups (including subgroups within the Latino and Asian groups) could be perfectly predicted by the extent to which their parents shared the teachers' conceptions of intelligence. Teachers tended to reward those children who were socialized into a view of intelligence that happened to correspond to their own. Yet, as we shall argue later, social aspects of intelligence, broadly defined, may be as important as, or even more important than, cognitive aspects of intelligence in later life. Some, however, prefer to study intelligence not in its social aspect, but in its cognitive one.

Definitions of any kind can provide a basis for explicit scientific theory and research, but they do not provide a substitute for them. Thus it was necessary for researchers to move beyond definitions, which they indeed did. Many of them moved to models based on individual differences.

Intelligence as Arising from Individual Differences: The Differential Model

McNemar (1964) was one of the most explicit in speculating on why we even have a concept of intelligence and in linking the rationale for the concept to individual differences. He queried whether identical twins stranded on a desert island and growing up together would ever generate the notion of intelligence if they never encountered individual differences in their mental abilities.

Perhaps without individual differences, societies would never generate the notion of intelligence and languages would contain no corresponding term. Actually, some languages, such as Mandarin Chinese, have no concept that corresponds precisely to the Western notion of intelligence (Yang & Sternberg, 1997a, 1997b), although they have related concepts that are closer, say, to the Western notion of wisdom or other constructs. Whatever may be the case, much of the history of the field of intelligence is based on an epistemological model deriving from the existence of one or more kinds of individual differences.

THE SEMINAL VIEWS OF GALTON AND BINET

If current thinking about the nature of intelligence owes a debt to any scholars it is to Sir Francis Galton and Alfred Binet. These two investigators – Galton at the end of the nineteenth century and Binet at the beginning of the twentieth century – have had a profound impact on thinking about intelligence, an impact felt to this day. Many present conflicting views regarding the nature of intelligence can be traced to a dialectical conflict between Galton and Binet.

Intelligence is Simple: Galton's Theory of Psychophysical Processes

Intelligence as Energy and Sensitivity. The publication of Darwin's (1859) *Origin of Species* had a profound impact on many lines of scientific endeavor. One of these lines of endeavor was the investigation of human intelligence. The book suggested that the capabilities of humans were in some sense continuous with those of lower animals, and hence could be understood through scientific investigation.

Galton (1883) followed up on these notions to propose a theory of the "human faculty and its development." Because Galton also proposed techniques for measuring the "human faculty," his theory could be applied directly to human behavior.

Galton proposed two general qualities that he believed distinguish the more from the less intellectually able. His epistemological rooting, therefore, was in the individual-differences approach. The first quality was *energy*, or the capacity for labor. Galton believed that intellectually gifted individuals in a variety of fields are characterized by remarkable levels of energy. The second general quality was *sensitivity*. Galton observed that the only information that can reach us concerning external events passes through the senses and that the more perceptive the senses are of differences in luminescence, pitch, odor, or whatever, the larger would be the range of information on which intelligence could act. Galton's manner of expression was direct:

The discriminative facility of idiots is curiously low; they hardly distinguish between heat and cold, and their sense of pain is so obtuse that some of the more idiotic seem hardly to know what it is. In their dull lives, such pain as can be excited in them may literally be accepted with a welcome surprise. (p. 28)

For seven years (1884–1890), Galton maintained an anthropometric laboratory at the South Kensington Museum in London where, for a small fee, visitors could have themselves measured on a variety of psychophysical tests. What, exactly, were these tests?

One was for weight discrimination. The apparatus consisted of cases of shot, wool, and wadding. The cases were identical in appearance and