NAME AS MANY USES AS YOU CAN THINK OF FOR A TOOTHPICK

J.P. GUILFORD (1897–1987)

IN CONTEXT

APPROACH
Intelligence psychometrics

BEFORE
19th century Wilhelm Wundt, Gustav Fechner, and Francis Galton claim that individual differences in people's cognitive abilities can be empirically measured.

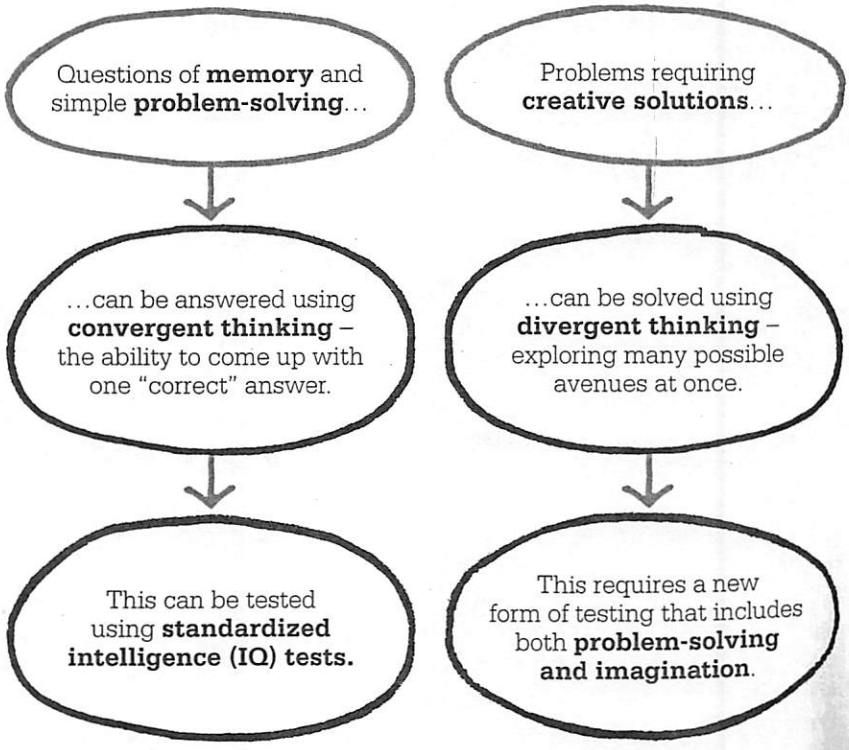
1904 British psychologist Charles Spearman claims intelligence can be summed up in a single number.

1938 British psychologist L.L. Thurstone identifies seven independent factors that make up a person's "primary abilities" or intelligence.

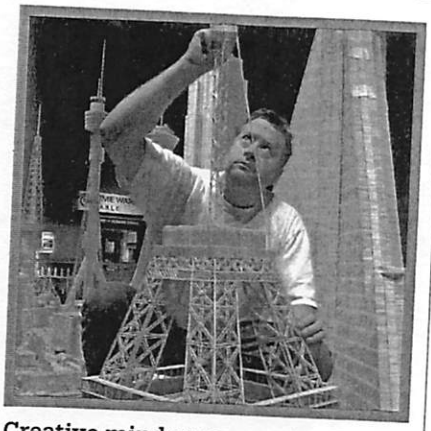
AFTER
1969 Philip E. Vernon estimates that intelligence is 60 percent inborn.

1974 US psychologist Ellis Paul Torrence produces his own tests of creativity, which are most widely used today.

Although intelligence, and what makes up intelligence, had been discussed since the time of ancient Greece, the first systematic method of measuring intelligence was not developed until 1905, when the French psychologist Alfred Binet was asked to identify children who might benefit from educational assistance. Together with researcher Theodore Simon, he created the "Binet–Simon Scale," which used memory, attention, and problem-solving tasks to measure and produce a number, or "quotient," that summarizes intellectual ability.



See also: Alfred Binet 50–53 ▪ Raymond Cattell 314–15 ▪ Hans J. Eysenck 316–21 ▪ William Stern 334 ▪ David Wechsler 336



Creative minds see even toothpicks as potentially having hundreds of uses. Guilford's "Alternative Uses Test" scores people on their ability to think of many original and widely assorted alternatives.

The average intelligence quotient (IQ) was set for convenience at 100, allowing psychologists to categorize people in relation to this score. In practice, around 95 percent of the general population score between 70 and 130, and the top 0.5 percent score over 145, the "genius" level.

Although the scale is still used for most IQ tests today, US psychologist J.P. Guilford believes it has fundamental flaws. Standard intelligence tests, he says, ignore creativity and assume that there is a "general intelligence" that can be represented by an IQ score.

Measuring creativity

By definition, creativity means there is more than one answer to any problem. It requires a different kind of thinking, which Guilford calls "divergent," since it goes in different directions and produces multiple solutions to a problem. In contrast, traditional IQ tests require thinking that ends up with a single answer: "convergent" thinking.

Guilford thought that creativity was measurable—it is indicated by the number of directions in which a person's thoughts travel. He devised a number of tests to quantify divergent thinking, including his 1967 "Alternative Uses Test," which asks participants to write as many uses as they can think of for: (a) a toothpick, (b) a brick, and (c) a paper clip. In his "Consequences Test," subjects were asked to imagine all the things that might possibly happen if all national and local laws were suddenly abolished. Guilford scored the answers on levels of four key components: originality, fluency, flexibility, and elaboration.

Guilford claims that intelligence is not made up of just one "general factor," but of three different groups of activities. "Operations" are the intellectual processes we use; there are six types of these, including memory, cognition, and evaluation. "Content" is the type of information or data involved—there are five of these, including visual and auditory content. "Products" are the results of applying operations to content, such as classes or relations, and there are six of these. The many ways in which we combine and use these different types means there may be anything up to 180 (6 × 5 × 6) types of intelligence—more than 100 of these have already been verified.

The complexity of Guilford's theory and problems with testing mean that his tests are used less frequently than standard IQ tests, but his work has influenced research into intelligence and creativity. ▪

J.P. Guilford

Joy Paul Guilford was born on a farm in Nebraska. Always markedly intelligent, he was the valedictorian of his high school class. His bachelor's degree in psychology was interrupted by a spell in the army as a private, but he went on to earn a PhD from Cornell University. In 1928, he returned to Nebraska as an associate professor, then took a position at the University of Southern California (USC) in 1940, remaining there—apart from a short secondment during World War II—until his retirement in 1967. Described as a devoted family man of enormous integrity and generosity, his shyness earned him the nickname "gray ghost" during his time in the army. An influential and prolific researcher, Guilford produced more than 25 books, 30 tests, and 300 articles.

Key works

1936 *Psychometric Methods*
1967 *The Nature of Human Intelligence*

> The person who is capable of producing a large number of ideas per unit of time… has a greater chance of having significant ideas.
> **J.P. Guilford**