Intelligence: Triarchic Theory of Intelligence

Gale Encyclopedia of Education:

Intelligence: Triarchic Theory of Intelligence

The triarchic theory of intelligence is based on a broader definition of intelligence than is typically used. In this theory, intelligence is defined in terms of the ability to achieve success in life based on one's personal standards - and within one's sociocultural context. The ability to achieve success depends on the ability to capitalize on one's strengths and to correct or compensate for one's weaknesses. Success is attained through a balance of analytical, creative, and practical abilities - a balance that is achieved in order to adapt to, shape, and select environments.

Information-Processing Components Underlying Intelligence

According to Robert Sternberg's proposed theory of human intelligence, a common set of universal mental processes underlies all aspects of intelligence. Although the particular solutions to problems that are considered "intelligent" in one culture may be different from those considered intelligent in another, the mental processes needed to reach these solutions are the same.

Metacomponents, or executive processes, enable a person to plan what to do, monitor things as they are being done, and evaluate things after they are done. *Performance components* execute the instructions of the metacomponents. *Knowledge-acquisition components* are used to learn how to solve problems or simply to acquire knowledge in the first place. For example, a student may plan to write a paper (metacomponents), write the paper (performance components), and learn new things while writing (knowledge-acquisition components).

Three Aspects of Intelligence

According to the triarchic theory, intelligence has three aspects: analytical, creative, and practical.

Analytical intelligence. Analytical intelligence is involved when the components of intelligence are applied to analyze, evaluate, judge, or compare and contrast. It typically is involved in dealing with relatively familiar kinds of problems where the judgments to be made are of a fairly abstract nature.

In one study, an attempt was made to identify the information-processing components used to solve analogies such as: A is to B as C is to: D1, D2, D3, D4 (e.g., lawyer is to client as doctor is to [a] nurse, [b] medicine, [c] patient, [d] MD). There is an *encoding* component, which is used to figure out what each word (e.g., *lawyer*) means, while the *inference* component is used to figure out the relation between *lawyer* and *client.*

Research on the components of human intelligence has shown that although children generally become faster in information processing with age, not all components are executed more rapidly with age. The encoding component first shows a decrease in processing time with age, and then an increase. Apparently, older children realize that their best strategy is to spend more time in encoding the terms of a problem so that they later will be able to spend less time in making sense of these encodings. Similarly, better reasoners tend to spend relatively more time than do poorer reasoners in global, up-front metacomponential planning when they solve difficult reasoning problems. Poorer reasoners, on the other hand, tend to spend relatively more time in detailed planning as they proceed through a problem. Presumably, the better reasoners recognize that it is better to invest more time up front so as to be able to process a problem more efficiently later on.

Creative intelligence. In work with creativeintelligence problems, Robert Sternberg and Todd Lubart asked sixty-three people to create various kinds of products in the realms of writing, art, advertising, and science. For example, in writing, they would be asked to write very short stories, for which the investigators would give them a choice of titles, such as "Beyond the Edge" or "The Octopus's Sneakers." In art, the participants were asked to produce art compositions with titles such as "The Beginning of Time" or "Earth from an Insect's Point of View." Participants created two products in each domain.

Sternberg and Lubart found that creativity is relatively, although not wholly, domain-specific. In other words, people are frequently creative in some domains, but not in others. They also found that correlations with conventional ability tests were modest to moderate, demonstrating that tests of creative intelligence measure skills that are largely different from those measured by conventional intelligence tests.

Practical intelligence. Practical intelligence involves individuals applying their abilities to the kinds of problems that confront them in daily life, such as on the job or in the home. Much of the work of Sternberg and his colleagues on practical intelligence has centered on the concept of tacit knowledge. They have defined this construct as what one needs to know, which is often not even verbalized, in order to work effectively in an environment one has not been explicitly taught to work in - and that is often not even verbalized.

Sternberg and colleagues have measured tacit knowledge using work-related problems one might encounter in a variety of jobs. In a typical tacit-knowledge problem, people are asked to read a story about a problem someone faces, and to then rate, for each statement in a set of statements,

how adequate a solution the statement represents. For example, in a measure of tacit knowledge of sales, one of the problems deals with sales of photocopy machines. A relatively inexpensive machine is not moving out of the showroom and has become overstocked. The examinee is asked to rate the quality of various solutions for moving the particular model out of the showroom.

Sternberg and his colleagues have found that practical intelligence, as embodied in tacit knowledge, increases with experience, but that it is how one profits, or learns, from experience, rather than experience *per se,* that results in increases in scores. Some people can work at a job for years and acquire relatively little tacit knowledge. Most importantly, although tests of tacit knowledge typically show no correlation with IQ tests, they predict job performance about as well as, and sometimes better than, IQ tests.

In a study in Usenge, Kenya, Sternberg and colleagues were interested in school-age children's ability to adapt to their indigenous environment. They devised a test of practical intelligence for adaptation to the environment that measured children's informal tacit knowledge of natural herbal medicines that the villagers used to fight various types of infections. The researchers found generally negative correlations between the test of practical intelligence and tests of academic intelligence and school achievement. In other words, people in this context often emphasize practical knowledge at the expense of academic skills in their children's development.

In another study, analytical, creative, and practical tests were used to predict mental and physical health among Russian adults. Mental health was measured by widely used paper-and-pencil tests of depression and anxiety, while physical health was measured by self-report. The best predictor of mental and physical health was the practical-intelligence measure, with analytical intelligence being the second-best measure and creative intelligence being the third.

Factor-Analytic Studies

Factor-analytic studies seek to identify the mental structures underlying intelligence. Four separate factor-analytic studies have supported the internal validity of the triarchic theory of intelligence. These studies analyzed aspects of individual differences in test performance in order to uncover the basic mental structures underlying test performance. In one study of 326 high school students from throughout the United States, Sternberg and his colleagues used the so-called Sternberg Triarchic Abilities Test (STAT) to investigate the validity of the triarchic theory. The test comprises twelve subtests measuring analytical, creative, and practical abilities. For each type of ability, there are three multiple-choice tests and one essay test. The multiple-choice tests involve verbal, quantitative, and figural content. Factor analysis on the data was supportive of the triarchic theory of human intelligence, as it was measured relatively separate and independent analytical, creative, and practical factors. The triarchic theory also was consistent with data obtained from 3,252 students in the United States, Finland, and Spain. The study revealed separate analytical, creative, and practical factors of intelligence.

Instructional Studies

In another set of studies, researchers explored the question of whether conventional education in school systematically discriminates against children with creative and practical strengths.

Motivating this work was the belief that the systems in most schools strongly tend to favor children with strengths in memory and analytical abilities.

The Sternberg Triarchic Abilities Test was administered to 326 high-school students around the United States and in some other countries who were identified by their schools as gifted (by whatever standard the school used). Students were selected for a summer program in college-level psychology if they fell into one of five ability groupings: high analytical, high creative, high practical, high balanced (high in all three abilities), or low balanced (low in all three abilities). These students were then randomly divided into four instructional groups, emphasizing memory, analytical, creative, or practical instruction. For example, in the memory condition, they might be asked to describe the main tenets of a major theory of depression. In the analytical condition, they might be asked to compare and contrast two theories of depression. In the creative condition, they might be asked to formulate their own theory of depression. In the practical condition, they might be asked how they could use what they had learned about depression to help a friend who was depressed.

Students who were placed in instructional conditions that better matched their pattern of abilities outperformed students who were mismatched. In other words, when students are taught in a way that fits how they think, they do better in school. Children with creative and practical abilities, who are almost never taught or assessed in a way that matches their pattern of abilities, may be at a disadvantage in course after course, year after year.

A follow-up study examined learning of social studies and science by 225 third-graders in Raleigh, North Carolina, and 142 eighth-graders in Baltimore, Maryland, and Fresno, California. In this study, students were assigned to one of three instructional conditions. In the first condition, they were taught the course they would have learned had there been no intervention, which placed an emphasis on memory. In the second condition, students were taught in a way that emphasized critical (analytical) thinking, and in the third condition they were taught in a way that emphasized analytical, creative, and practical thinking. All students' performance was assessed for memory learning (through multiple-choice assessments) as well as for analytical, creative, and practical learning (through performance assessments).

Students in the triarchic-intelligence (analytical, creative, practical) condition outperformed the other students in terms of the performance assessments. Interestingly, children in the triarchic instructional condition outperformed the other children on the multiple-choice memory tests. In other words, to the extent that one's goal is just to maximize children's memory for information, teaching triarchically is still superior. This is because it enables children to capitalize on their strengths and to correct or to compensate for their weaknesses, allowing them to encode material in a variety of interesting ways.

In another study, involving 871 middle-school students and 432 high school students, researchers taught reading either triarchically or through the regular curriculum. At the middle-school level, reading was taught explicitly. At the high school level, reading was infused into instruction in mathematics, physical sciences, social sciences, English, history, foreign languages, and the arts. In all settings, students who were taught triarchically substantially outperformed students who were taught in standard ways.

Conclusion

The triarchic theory of intelligence provides a useful way of understanding human intelligence. It seems to capture important aspects of intelligence not captured by more conventional theories. It also differs from the theories of Howard Gardner, which emphasize eight independent multiple intelligences (such as linguistic and musical intelligence), and from the theory of emotional intelligence. The triarchic theory emphasizes processes of intelligence, rather than domains of intelligence, as in Gardner's theory. It also views emotions as distinct from intelligence. Eventually, a theory may be proposed that integrates the best elements of all existing theories.

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— *ROBERT J. STERNBERG*

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