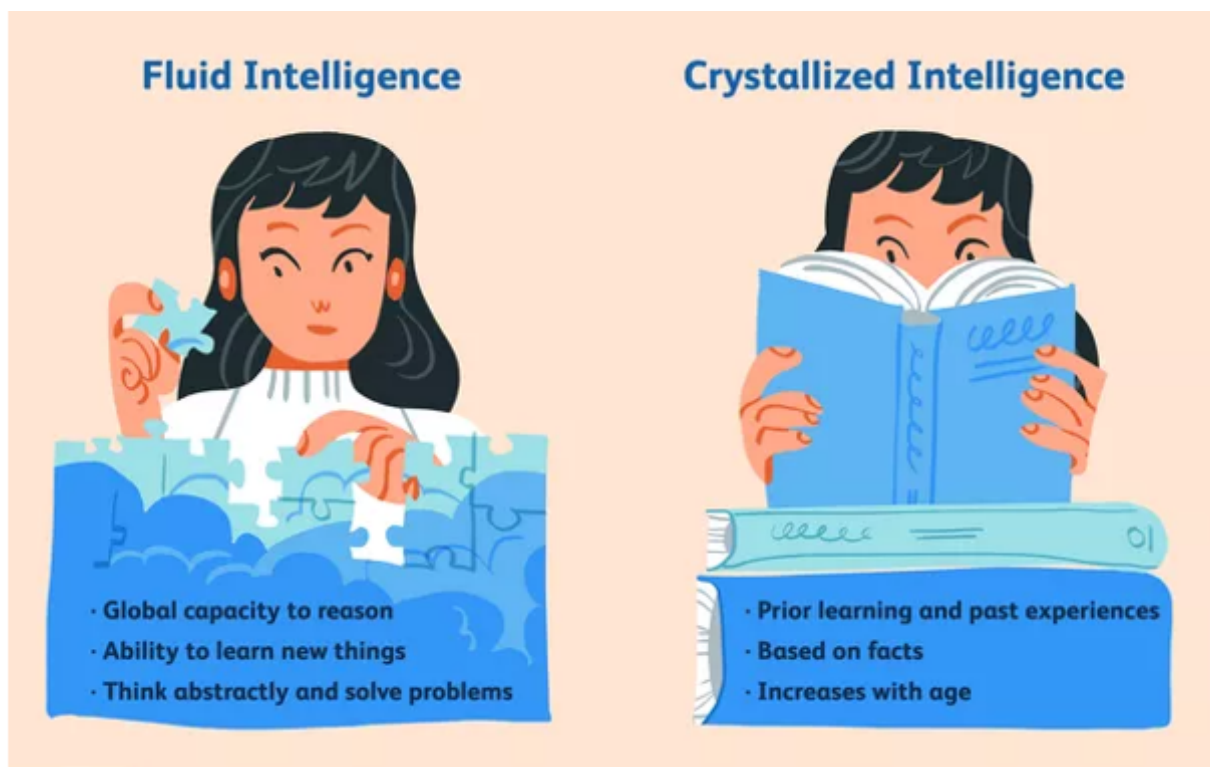


Fluid Intelligence versus Crystallized Intelligence

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The theory of fluid and crystallized intelligence was first introduced in 1963 by British-American Psychologist Raymond Cattell. Raymond Cattell believed that intelligence comprised of multiple constructs which he put into two categories, namely fluid and crystallized intelligence. [Cattell later developed this theory with his student John Horn. The Cattell-Horn theory of fluid and crystallized intelligence suggests that intelligence is composed of different abilities that interact and work together to produce overall individual intelligence.](#) Crystallized intelligence involves knowledge that comes from prior learning and past experiences, while fluid intelligence is the ability to think abstractly, reason quickly, and solve problems independently of any previously acquired knowledge. In other words, fluid intelligence is the capacity to reason under new conditions. This essay will look at the differences and similarities between fluid and crystallized intelligence in relation to cognitive functioning, aging, and memory.



Fluid Intelligence vs Crystallized Intelligence in relation to memory

[Fluid ability is associated with processes underlying intelligence that include processing speed, working](#)

memory, and reasoning. These core abilities are drawn upon to engage in complex thought, solve problems, and function in everyday life. Research suggests that working memory plays a fundamental role in fluid intelligence. Working memory is described as a limited capacity system that temporarily stores information and processes it, making it possible for the individual to perform complex activities, such as reasoning, learning, and understanding. Working memory capacity and fluid intelligence have been demonstrated to be strongly correlated traits. Tests of working memory capacity and fluid intelligence measure complementary processes that facilitate complex cognition. Most theorists believe that the relationship between working memory and fluid intelligence is not causal but that it is similar at the executive level. This is to say that the processes underlying working memory and fluid intelligence are related. They both lead to complex thought processing and problem-solving when individuals are presented with new information.

On the other hand, crystallized intelligence is associated with processes related to procedural and declarative memory. These processes lead to general and specialized knowledge and wisdom based on facts and past experiences. Declarative and procedural memory are encoded memories that are recalled subconsciously or consciously, respectively. These memories are a result of learning or experience hence the reason why their processes are believed to be closely related to those of crystallized intelligence. It is therefore clear to see that whilst fluid intelligence is linked to working memory, crystallized intelligence is linked to procedural and declarative memory.

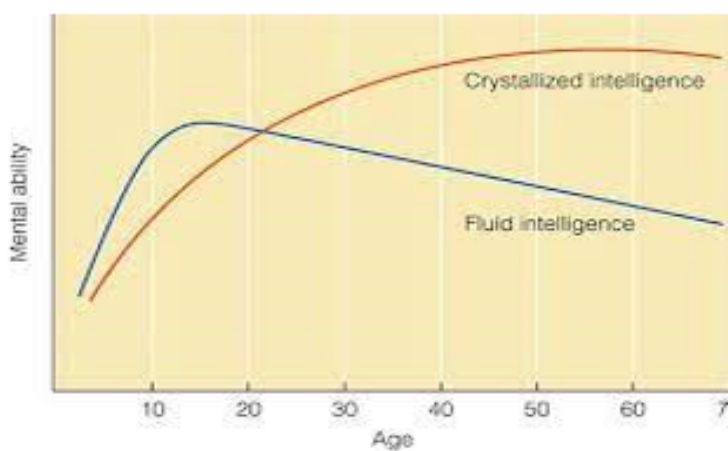
Related: [Crystallized intelligence: Everything you need to know](#)

Fluid Intelligence vs Crystallized Intelligence in relation to aging

Another significant difference between fluid intelligence and crystallized intelligence is the impact of aging. Crystallized intelligence increases as you age and gain more life experience. It then begins to slow down and then stabilizes. It is important to note that crystallized intelligence grows throughout adulthood, as a person continues to learn and experience different things. In a study by John Horn and Raymond Cattell in 1967, the mean level of crystallized intelligence was systematically higher for older adults (relative to younger adults).

On the other hand, fluid intelligence increases through childhood and peaks at adolescence around 20 years of age and then declines in adulthood. In a study done by John Horn and Raymond Cattell, the mean level of fluid intelligence was systematically higher for younger adults (relative to older adults). Research suggests that a decline in fluid intelligence could be a result of local atrophy of the brain in the right cerebellum, a lack of practice, or the result of age-related changes in the brain. In a paper by Ian

McDonough on patients with Alzheimer's diseases, [the results indicated a rapid decline in fluid intelligence whilst crystallized intelligence gradually declined](#). The results from this study suggest that age-related deficits affect fluid intelligence more than crystallized intelligence. It is, therefore important to note that age plays a fundamental role in understanding fluid and crystallized intelligence. The constant growth of crystallized intelligence is attributed to continuous learning and experience from life, whilst the decline in fluid intelligence is attributed to age-related brain changes such as the loss of function of brain neurons and lack of practice. Conclusively fluid intelligence is higher in younger adults whilst crystallized intelligence is higher in older adults.



Fluid Intelligence vs Crystallized Intelligence in relation to tests

The fluid and crystallized intelligence tests vary in form due to their differences in processes and functions.

Related: [Fluid Intelligence: What you need to know](#)

Tests for Fluid Intelligence

Tests for fluid intelligence primarily want to measure an individual's ability to problem-solve, think critically and abstractly. In most cases, participants are introduced to new information or data that they have to work with. [To investigate fluid intelligence, non-verbal tasks and tests are usually employed, as they are less dependent on culture and language](#). Some of the tests that are used to measure fluid intelligence include;

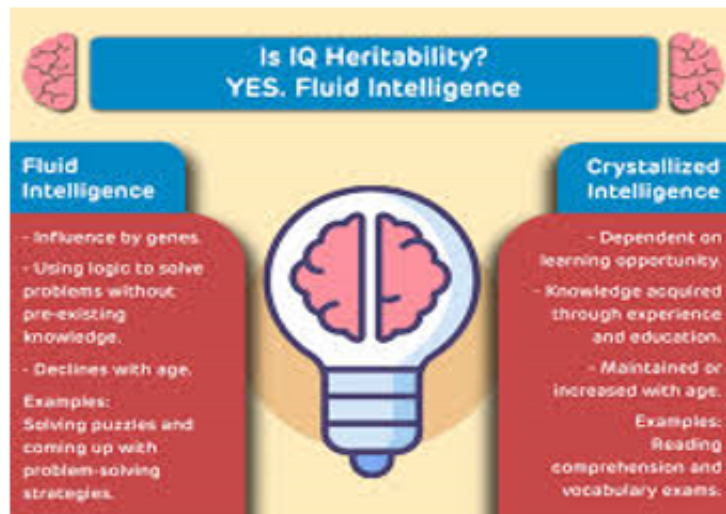
1. Raven's Progressive Matrices
2. Woodcock-Johnson Tests of Cognitive Abilities, Third Edition
3. Wechsler Intelligence Scales for Children, Fourth Edition

Tests for Crystallised Intelligence

The tests for crystallized intelligence measure an individual's ability to recall information that they have learned or draw lessons from their experiences. Crystallized intelligence is measured by tests such as vocabulary and general knowledge type assessments. The most popular test used is the WAIS-III Vocabulary test.

It is therefore important to note that fluid intelligence is tested by measuring abstract reasoning and critical thinking; hence non-verbal tests are mainly used. On the other hand, crystallized intelligence is tested by measuring information already known; hence verbal tests are primarily used in this instance.

Whilst there are distinct differences between crystallized intelligence and fluid intelligence, it is important to note that they are highly correlated and that they often complement each other. Research indicates [that people with higher levels of fluid intelligence will generally amass information faster, allowing higher crystallized intelligence.](#) Cattell believes that fluid intelligence and crystallised intelligence both contribute to what is known as general intelligence. For any individual to function both forms of intelligence have to come into play. In the face of challenges that every individual will encounter at some point in their life, there is a need to use fluid information. On the other hand, each individual must use the information they have learned from school or in life to function.



In conclusion, there are significant differences between fluid and crystallized intelligence with regard to cognitive processing, memory, and age. However, both of them contribute to general intelligence and support the daily functioning of an individual.

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