Definitions of "Intelligence" in Psychology

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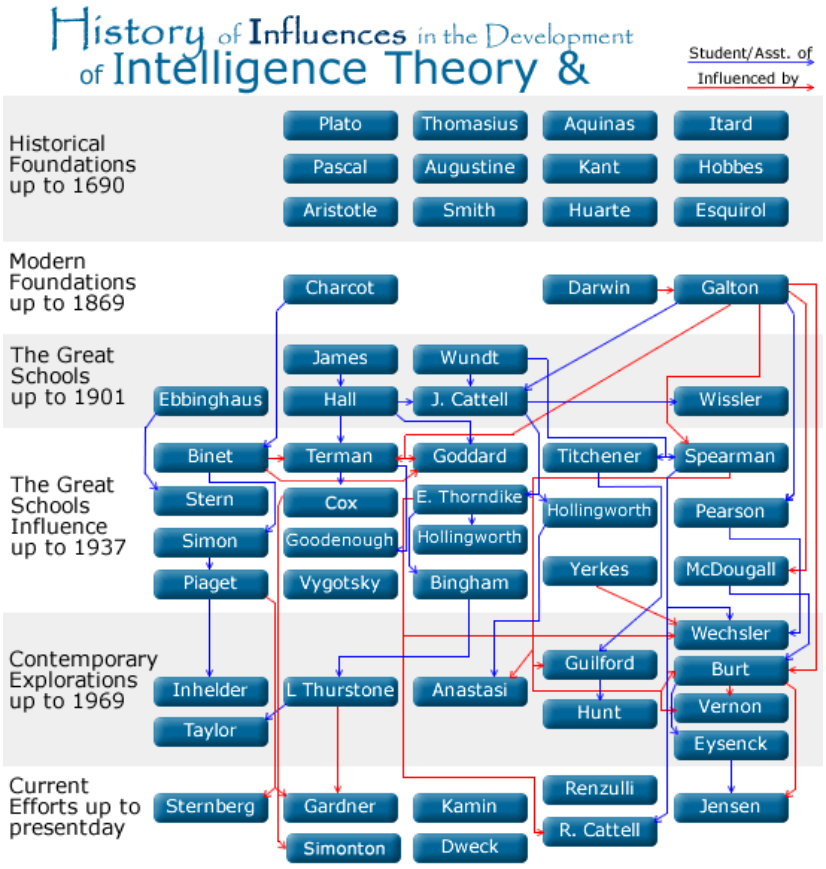


The diagram/map above is taken from the Human Intelligence website (Plucker & Esping, 2014) and illustrates how many thinkers have contributed to the debate over the nature of intelligence.

Here are some of the more well-known definitions that have been suggested.

David Wechsler

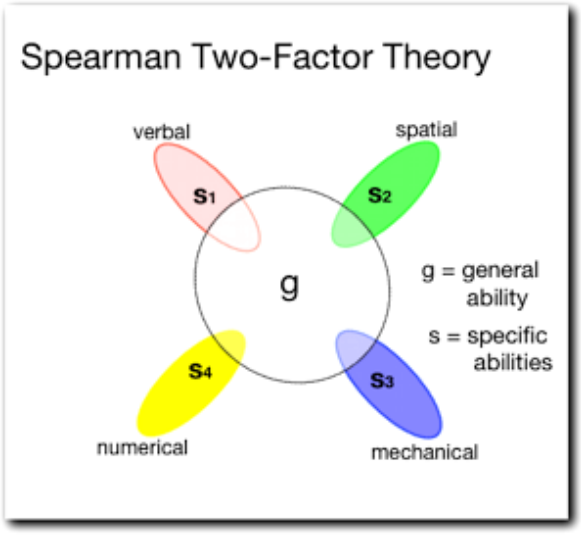
> "Intelligence is the aggregate or global capacity of the individual *to act purposefully*, *to think rationally*, and *to deal effectively with his environment*" (Wechsler, 1940; most well-known version of his definition; emphasis added).
>
> "What intelligence tests measure, what we hope they measure, is something much more important: the capacity of an individual to understand the world about him and his resourcefulness to cope with its challenges." (Wechsler, 1975, p. 139)

Anne Anastasi (one of my professors)

> "Intelligence is not a single, unitary ability, but rather a composite of several functions. The term denotes that combination of abilities required for survival and advancement within a particular culture." Anastasi (1992)

Charles Spearman (*Two-Factor Theory*)

Initially Spearman argued that "intelligent behavior is generated by a single, unitary quality within the human mind or brain. Spearman derived this theoretical entity, called the general factor, or simply g, through a new statistical technique that analyzed the correlations among a set of variables. This technique, called factor analysis, demonstrated that scores on all mental tests are positively correlated; this offered compelling evidence that all intelligent behavior is derived from one metaphorical pool of mental energy." (Plucker & Esping, 2014: http://www.intelltheory.com/spearman.shtml)



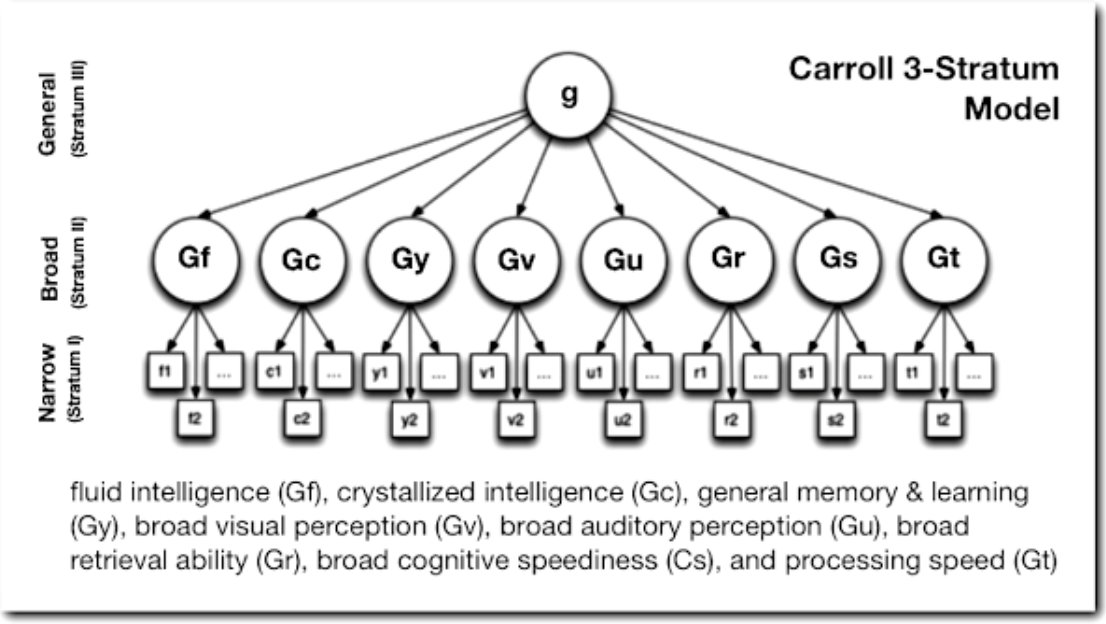
Eventually, Spearman agreed that there were a limited number of specific abilities which varied from individual to individual that were labelled 's' (see diagram above).

Raymond Cattel & John Horn (*Fluid vs. Crystallized Intelligence Theory*)

"The Cattell-Horn theory of **fluid (Gf) and crystallized (Gc) intelligence** proposes that general intelligence is actually a conglomeration of perhaps 100 abilities working together in various ways in different people to bring out different intelligences. Gf-Gc theory separates these abilities broadly into, first, two different sets of abilities that have quite different trajectories over the course of development from childhood through adulthood. **Fluid abilities (Gf)** drive the individual's ability to think and act quickly, solve novel problems, and encode short-term memories. They have been described as the source of intelligence that an individual uses when he or she doesn't already know what to do. Fluid intelligence is grounded in physiological efficiency, and is thus relatively independent of education and acculturation. The other factor, encompassing **crystallized abilities (Gc)**, stems from learning and acculturation, and is reflected in tests of knowledge, general information, use of language (vocabulary) and a wide variety of acquired skills. Personality factors, motivation and educational and cultural opportunity are central to its development, and it is only indirectly dependent on the physiological influences that mainly affect fluid abilities." (Plucker & Esping, 2014: http://www.intelltheory.com/rcattell.shtml)

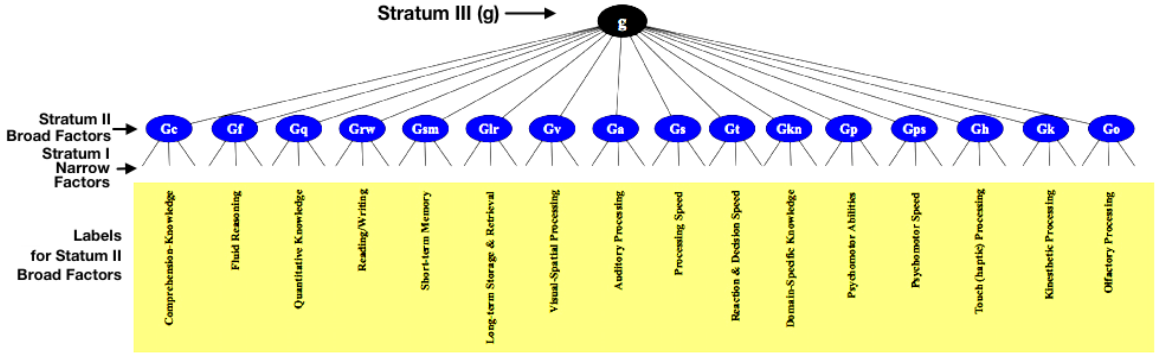
C-H-C Theory (*Cattel-Horn-Carroll Theory*)

Psychologist John Carroll "is well-known for his seminal work, *Human Cognitive Abilities: A Survey of Factor Analytic Studies* (1993), in which he reanalyzed over 400 data sets of cognitive ability test scores. Based on his reanalyses, he proposed a Three-stratum Model of Human Cognitive Abilities (see diagram on next page).



- Stratum III -- the general level; general intellectual ability, similar to g
- Stratum II -- the broad level; eight factors, including fluid intelligence, crystallized intelligence, general memory and learning, broad visual perception, broad auditory perception, broad retrieval ability, broad cognitive speediness, and processing speed.
- Stratum I -- the specific level; more specific factors grouped under the Stratum II factors.

Carroll's work was synthesized with the previous work of Cattel and Horn to form what is now perhaps the major theory of intelligence in psychology: C-H-C Theory



Dean K. Simonton

"My view of intelligence is basically a Darwinian one. It's based on sort of the old Functionalist notion that goes way back to Francis Galton, that says that there are a certain set of cognitive capacities that enable an individual to adapt and thrive in any given environment they find themselves in, and those cognitive capacities include things like memory and retrival, and problem solving and so forth. There's a cluster of cognitive abilities that lead to successful adaptation to a wide range of environments." (Simonton, 2003)

Anastasi, A. (1992). What counselors should know about the use and interpretation of psychological tests. *Journal of Counseling and Development, 70*(5):610–615.

Plucker, J. A., & Esping, A. (Eds.). (2014). Human intelligence: Historical influences, current controversies, teaching resources. http://www.intelltheory.com.

Simonton, D. K. (2003, July 5). Interview with Dr. Simonton. https://www.intelltheory.com/simonton_interview.shtml

Wechsler, D. (1940). Non-intellective factors in general intelligence. *Psychological Bulletin, 37*, 444-445.

Wechsler, D. (1975). Intelligence defined and undefined: A relativistic appraisal. *American Psychologist, 30*(2), 135-139.