

## Class

Intelligence is an essential construct in ABA. Cohen et al. (1996) define intelligence as a multifaceted capacity that manifests differently in a person's lifespan. It includes the ability to reason logically, be intuitive, plan effectively, acquire and apply knowledge, and grasp and visualize concepts. The measurement of intelligence involves sampling an examinee's performance on various tasks and tests as a function of developmental level (Cohen et al., 1996). The assessment process presents a standardized situation to monitor an examinee's approach to various tasks.

Theorists use factor analysis, a group of statistical techniques designed to evaluate the existence of underlying relationships between test scores, to study relationships between various tests and abilities assumed to reflect the attribute of intelligence (Cohen et al., 1996). Examples of theories measuring the interrelationships are Spearman's two-factor theory (1927), Cattell-Horn's two-factor theory (1966), Luria's information processing approach (1966), Cattell-Horn and Carroll's CHC model (1997), and Carroll's three stratum theory (1997).

Spearman's two-factor theory highlights that the measures of intelligence correlate to various degrees with each other, as outlined by a general intellectual ability factor, *g*. The factor, *g*, represents the variance that all intelligence tests have in common.; the remaining variance is accounted for by error (*e*) and specific (*s*) components. Tests exhibiting high positive correlations are saturated with *g* (Cohen et al., 1996). Those with low correlations with other tests are considered possible measures of specific factors.

On the other hand, Cattell-Horn's two-factor theory proposed the existence of two primary cognitive abilities—fluid intelligence (*Gf*) (memory for digits) and crystallized intelligence (*Gc*) (vocabulary). The theory further postulates that some abilities diminish with time, some do

decline (Gv), and some are maintained (Gq). Luria's information processing approach focuses on the mechanisms by which information is processed rather than what is processed. The basic types of information processing are simultaneous and successive, where information is integrated all at one time and in sequence, respectively.

Cattell-Horn-Carroll model integrates the Gf-Gc theory (Carroll's three stratum theory and Cattell-Horn theories). It has a broad-stratum ability subsuming two or more narrow spectrums. The ten broad stratum abilities are labeled as crystallized intelligence (Gc), fluid intelligence (Gf), reading/writing (Grw), short-term memory (Gsm), visual processing (Gv), long-term storage and retrieval (Glr), decision/reaction time of speed (Gt), processing speed (Gs), visual processing (Gv) and auditory processing (Ga).

Finally, in the three-stratum theory of cognitive abilities, the top level is general intelligence, g. The second stratum is composed of fluid intelligence (Gf), crystallized intelligence (Gc), general memory (Y), broad auditory perception (U), broad visual perception (V), broad cognitive speediness (S), broad retrieval capacity (R) and processing speed (T). This theory is similar to Cattell-Horn's two-factor theory in terms of Gf and Gc. However, other factors such as general reasoning and Piagetian reasoning are linked to Gf. The speed of reasoning is linked to Gf. Language development, spelling ability, comprehension, and communication ability are linked to Gc. Speed factors linked to Gc are writing ability and oral fluency (Cohen et al., 1996).

Wechsler Intelligence Scale for Children, the fifth edition relies on the Cattell-Horn-Carroll (CHC) theory—each of the WISC-V scales corresponds to CHC abilities. The Verbal Comprehension Index corresponds to crystallized ability (Gc), the Fluid Reasoning Index

corresponds to fluid problem solving (Gf), the Processing Speed Index corresponds to processing speed (Gs), and the Working Memory Index corresponds to short-term memory (Gsm).

On the other hand, Kaufman Assessment Battery for Children, Second edition is based on two theories—Luria's information processing approach and Cattell-Horn-Carroll (CHC) hierarchically organized model (Cohen et al., 1996). The WISC also provides an option to a supplementary scale, Symbol Translation, which corresponds to the long-term storage and retrieval (Glr)

The Stanford Binet Intelligence Scale fifth edition is based on the Cattell-Horn (CHC) theory. Finally, the Woodcock-Johnson Tests of Cognitive Abilities, the third edition, is based on Cattell-Horn-Carroll theory. It examines factors based on nine broad spectrum stratum abilities: long-term memory, comprehension-knowledge, fluid reasoning, short-term memory, quantitative knowledge and reading-writing, and processing speed. The cognitive measures examined are GC, Gs, and Gf (Cohen et al., 1996).

The Kaufman Assessment Battery for Children, the second edition, is the test based on two theories. The dual theoretical basis offers a higher degree of construct validity. As a professional interested in helping children aged two to 9 years develop their cognitive ability fully, the Woodcock-Johnson Tests of cognitive abilities is the most affiliated to my professional goals. The tool is useful in identifying emergent cognitive abilities and early academic skills. Consequently, it identifies cognitive delays to inform early interventions.

-MyName

### **Reference**

Cohen, R. J., Swerdlik, M. E., & Phillips, S. M. (1996). *Psychological testing and assessment: An introduction to tests and measurement*. Mayfield Publishing Co.

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