Measurement of Fluid and Crystallized Intelligence

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Cattell Culture Fair III

In seeking to develop a culture-fair intelligence or IQ test that separated environmental and genetic factors, Raymond B. Cattell created the CFIT or Culture Fair Intelligence Test. Cattell argued that general intelligence (g) exists and that it consists of fluid intelligence and crystallized intelligence. Unlike other tests, which typically use a deviation of 15 or 16, Cattell uses a deviation of 24. This means if same normally distributed population took both tests, the central 68.2% would fall between 76 and 124 on Cattell but 85 and 115 on Stanford Binet 5 (deviation 15).

Development

Cultural and age differences

Crystallized intelligence (gc) refers to that aspect of cognition in which initial intelligent judgments have become crystallized as habits. Fluid intelligence (gf) is in several ways more fundamental and shows in tests requiring responses to entirely new situations. Before biological maturity individual differences between gf and gc will be mainly a function of differences in cultural opportunity and interest. Among adults, however these discrepancies will also reflect differences in age because the gap between gc and gf will tend to increase with experience which raises gc (whereas it has been shown that with increase in age some decay of gf occurs).

Current use

The Triple Nine Society is a high IQ society that uses the CFIT-III as one of their tests for admission. A combined score of 85 on forms A and B is required for admission.

Validity

Direct concept validity

Direct concept validity (sometimes called construct validity) refers to the degree to which a certain scale correlates with the concept or construct (i.e., source trait) which it purports to measure. Concept validity is thus measured by correlating the scale with the pure factor and this can only be carried out by performing a factor analysis. The relatively high loading of the Culture Fair Intelligence scale on the fluid intelligence factor indicates that the Culture Fair scale does, in fact, have a reasonably high direct concept validity with respect to the concept of fluid intelligence.

The Culture Fair intelligence measure loaded higher on the "General Intelligence" factor than it did on the "Achievement" factor, which is consistent with the concept of the CFIT's being a measure of "fluid" rather than "crystallized" intelligence.

Convergent validity

Convergent Validity is the extent to which the Culture fair test correlates with other tests of intelligence, achievement, and aptitude. Downing et al. (1965) obtained the relationships between the Culture Fair Intelligence Test and other intelligence tests.

Further consideration

Tentative timed and untimed age trends

Some readers might wonder what use there is in giving the test under untimed conditions. Indeed, this use is completely experimental at the moment and under no circumstances should it be followed when a conventional IQ is desired. A major use of the untimed test lies in its potential for answering presently unresolved research questions. For example, it has been suggested that different cultures may have different attitudes towards the usage of time. In one culture a person may have learned to work as fast as possible when he is in a timed test situation, whereas in a different culture this might not be the case. In this event, giving the test under untimed conditions would make cross cultural comparisons more fair. Also, within any given culture there may be a wide range of responses to the timed condition. Some individuals may do better when they are under pressure, whereas others may become very anxious and therefore not perform at their highest level. Thus, an untimed version of the test may control for some of the motivational and personality differences that can distort test performance. It is possible that the untimed IQ score would be a better predictor since, in real life, the events that result in job success do not usually involve solving problems under strictly timed conditions, but often allow for a quite lengthy concentration on the problem in hand. This is, of course, merely an hypothesis, but, if correct, it could increase the utility of intelligence tests in both the vocational and educational fields.