

Discuss the main issues in defining and measuring intelligence.

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Abstract

The study of intelligence began in the late 1800's, and despite rigorous investigation, the scientific community remain divided over its exact definition and appropriate measurement (Weinberg, 1989). In its most popular sense, intelligence has been defined as the ability to learn new information, and apply such information to manipulate one's environment. Other definitions include adaptability to new environments and changes to the current environment, the ability to reason and evaluate, to learn quickly and from experience, or even the capacity for innovative thoughts and ideas. However despite this intellectual quagmire, two broad schools of thought have emerged. The first believes that all intelligence comes from a single, general factor. The second believes there is more than one type of intelligence, although proponents of this view have yet to agree exactly how many types of intelligence exist.

The purpose of this paper is to discuss each school of thought in turn and identify both their contributions and shortcomings. Furthermore, as theories of intelligence vary, so do the proposed methods of intelligence measurement, and these too will be critically examined.

Main Body

The oldest theory of intelligence was proposed by Charles Spearman in the early 20th century (Spearman, 1904). Employing a statistical approach, he observed that children's school performance appeared to correlate across seemingly unrelated subjects. Spearman reasoned that such correlations indicated a single underlying general mental ability, affecting performance

across different mental tests, which he coined the ' general' or ' g' factor. In addition, he argued for the existence of ' specific' or ' s' factors which related to narrow and task-specific abilities, such as vocabulary range or mathematical skill, although Spearman and his subsequent followers placed more emphasis on the importance of g.

Proponents of uni-factor theories of intelligence draw upon the phenomenon of the positive manifold (Spearman, 1904) as support for the concept. Simply put, it is the fact that different tests of cognitive ability appear to correlate together highly. Although early critics of Spearman's approach challenged his model with newer methods of analysis (see Thurstone, 1938), it has remained hugely influential, leading Kane and Brand (2003) to conclude:

" Spearman's g, through custom and empirical evidence, has become the ubiquitous cornerstone of empirically based theories of intelligence. It is the reference point for most studies conducted over the past ninety years. Every factor analytic study of cognitive ability has yielded a g, provided the data were analysed in such a manner as to allow a general factor to materialise"(Kane & Brand, 2003: 12)

The major criticism of Spearman's theory was levelled at its simplicity. Several theorists subsequently proposed that intelligence in fact comprised several separate abilities that did not correlate with each other. Amongst the earliest challenge to Spearman's unitary concept of intelligence was Louis Thurstone's (1938) Theory of Primary Mental Abilities. Thurstone proposed that intelligence arose from seven primary independent factors, which

included verbal comprehension, numeric ability, spatial relations, perceptual speed, word fluency, memory and inductive reasoning.

Using a revolutionary psychometric approach, multiple factor analysis, Thurstone analysed the results of mental reasoning tests from a sample with similar IQ scores, and found that they had different profiles of mental abilities. However, similar analyses of data from a more heterogeneous population did not support a seven-factor model; instead it provided evidence for a single-factor model, or 'g'. Conceptualising intelligence as a single general factor led to Spearman's hypothesis that intelligence could be measured using a mental aptitude test and scored with a simple numerical value. This became the forerunner of the modern intelligence quotient.

In contrast, proponents of multiple intelligences agree there is more than one single type of intelligence, although theorists do not agree on exactly how many different types exist. Gardner (1983) proposed a multi-factor model of intelligence, differentiating eight modalities which were weakly correlated at best. These factors included linguistic, logical-mathematical, spatial, musical, kinaesthetic, interpersonal and intrapersonal intelligence, and could account for individuals who were, for example, simultaneously good at language tasks and poor at spatial awareness tasks. This new concept of intelligence was born out of the criticism that standard intelligence tests were biased towards North American and European culture, and crucially Gardner felt that traditional tests of intellect provided measures of linguistic, logical and spatial intelligence, and ignored factors such as musical ability and athleticism. However, Gardner's formulation has had a

minimal effect on intelligence testing, primarily because the type of quantitative factor analytical study that is required to validate such an approach has never been undertaken (Benson, 2003).

Following Gardner's work was Sternberg's Triarchic Theory of Intelligence (1985). Like Gardner, Sternberg agreed that intelligence was more than a single general ability, but felt that Gardner's theory merely described talents rather than defined intelligence. Sternberg defined intelligence as "mental activity directed toward purposive adaptation to, selection and shaping of, real-world environments relevant to one's life" (Sternberg, 1985 p. 45) and described three major components; practical intelligence (an ability to adapt to one's environment), experiential intelligence (the ability to think in novel ways) and componential intelligence (the efficient processing of information). Using this model, he was able to describe individuals who were talented in one area, but less so in the other two, similarly to Gardner, but avoided aligning specific components of intelligence with academic disciplines.

Sternberg's approach has won particular acclaim with reference to real-life situations (Carragher, Carragher, & Schliemann, 1985); indeed it is Sternberg's practical dimension of intelligence that can account for cultural discrepancies present in other methods of intelligence testing. G-theorists however argue that practical intelligence represents little more than 'job knowledge' and can be better explained by g (Jensen, 1993).

Conclusion

Even in contemporary psychology, considerable debate over the exact nature of intelligence is ongoing, and definitive conceptualisation (and therefore measurement) remains elusive. Two distinct schools of thought remain; uni-factor and multi-factor theories of intelligence. Both have particular strengths and weaknesses, but given that considerable debate about the nature of intelligence remains, and no single approach is accepted by all, there is still room for improvement on any given theory.

References

Benson, E. (2003). Intelligent intelligence testing. *Monitor* 43, (2) 48 – 56.

Carraher, T. N., Carraher, D., & Schliemann, A. D. (1985). Mathematics in the streets and in schools. *British Journal of Developmental Psychology* 3 21-29.

Jensen, A. R. (1993). Test validity: g versus “ tacit knowledge”. *Current Directions in Psychological Science* 2, (1), 9-10.

Kane, H & Brand, C. (2003). The importance of Spearman's' g as a psychometric, social and educational construct. *The Occidental Quarterly* 3 (1) 7 – 29.

Spearman, C. (1904). “ General intelligence”, objectively determined and measured. *American Journal of Psychology* 15, 201 – 293.

Sternberg, R. J. (1985). *Beyond IQ: A Triarchic Theory of Intelligence*. Cambridge: Cambridge University Press.

Thurstone, L. L. (1938). *Primary mental abilities*. Chicago: University of Chicago Press.

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Weinberg, R. A. (1989). Intelligence and IQ: Landmark issues and great debates. *American Psychologist* 44 (2), 98-104.