

CRITICAL REVIEW

A NEW VIEW OF HUMAN INTELLIGENCE

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STERNBERG, R. J. (1985). *Beyond IQ: a Triarchic Theory of Human Intelligence*. Cambridge: Cambridge University Press, h/b £25·00, p. £8·95.

Robert Sternberg, of Yale University, first became known in psychology as an advocate of the componential theory of intelligence, which in many ways is a development of Spearman's neogenetic theory according to which the three major aspects or components of intelligence are the apprehension of experience, the eduction of relations, and the eduction of correlates. In his componential model Sternberg broke down these very general classes, and used a variety of experimental paradigms for isolating the information-processing origins of general intelligence. In these experiments, he endeavoured to establish parameter estimates for latency components of such aspects of the task as encoding, comparison, justification and response. His contribution was both important and novel, and has rightly been praised by many expert judges. In his new book he presents a new "triarchic" theory of human intelligence which he states is to some extent an outgrowth of the componential theory, which now is only one of three sub-theories. The first of these he calls a "contextual" sub-theory, which specifies how intelligent behaviour is defined in large part by the socio-cultural context in which this behaviour takes place. It involves adaptation to the given environment, selection of a more nearly optimal environment than the one actually inhabited, and the shaping of the present environment so as to render it a better fit to one's skills, interest or values.

The second sub-theory he calls "experiential"; it states that for a given task or situation, contextually appropriate behaviour is not equally "intelligent" at all points along the continuum of experience with that behaviour or class of behaviours. Intelligence, he suggests, is best demonstrated when one is (a) confronted with a relatively novel task or situation, or is (b) in the process of automatizing performance on a given task or in a given situation.

The third sub-theory is a development of his componential view, and specifies the structures and mechanisms that underlie intelligent behaviour. "The componential sub-theory completes the triarchy or specification that define the extent to which given behaviour is *intelligent*." This, in brief, is Sternberg's triarchic theory; can it be said to be an advance on his more restricted componential theory?

Let me state first of all that the book is always interesting, full of novel ideas and experimental data which throw light on human behaviour. Consequently it should certainly be widely read, and while it is written in an overblown, sesquipedalian style that makes it often quite difficult to follow what the author is saying, trying to understand him is nevertheless well worth the effort. On the whole, then, the book is a genuine contribution to psychological theory. What I would doubt very much, however, is whether it is a contribution to the theory of *intelligence*.

Sternberg's triarchic theory seems to deal with human behaviour in general, as far as it is adaptive. Now I think it should be realised that of all human behaviour, even of adaptive behaviour, only a relatively small proportion is relevant to the concept of intelligence. Sternberg is, of course, entitled to redefine intelligence in any way he sees fit, but this disregards the established meaning of the term, and is hence extremely misleading. Sternberg would include in the term such factors as personality, mental disorder, past learning and experience, and many other factors which have a bearing on adaptation, but which are unrelated to traditional concepts of intelligence. To take but one example, Terman in his *Studies in Genius* found that the high IQ children he studied were nearly all successful in their later adaptations to life, but that a small proportion were unsuccessful and ended up in dead-end occupations, earning little money, and being relatively unhappy (Oden, 1968). These, he found, had as children been rated as neurotic, emotional or disturbed. In other words, neuroticism interferes with the worldly success otherwise likely to follow from the possession

of a high IQ, and hence neuroticism would be included by Sternberg in his very wide concept of intelligence. However, intelligence as psychometrically defined is uncorrelated with neuroticism, and it would seem a much more reasonable and indeed more scientific way of dealing with the problem to regard neuroticism and intelligence as separate factors which interact and jointly may determine a person's adaptation to the problems of everyday life.

We may with advantage go back to the old notion introduced by Donald Hebb (1949) and Philip Vernon (1979) of Intelligence A, Intelligence B and Intelligence C. Intelligence A, or biological intelligence, refers to the biological substratum of all cognitive behaviour (problem-solving, learning, memory, invention of strategies, etc.), while Intelligence B (social intelligence) refers to the use made by a person of Intelligence A in his everyday life, and hence encompassing a large number of factors which are independent of Intelligence A, such as personality, temperament, physique, education etc. Intelligence C, in this scheme, is psychometric intelligence as defined by IQ tests. These are relatively good measures of Intelligence A, but are also to some extent vitiated as pure measures of a scientific concept by the same factors that are influencing Intelligence B. From the point of view of science, which relies on analysis rather than on confounding of clearly differentiated concepts, Intelligence A is surely the only meaningful connotation of the term "intelligence"; Intelligence C is acceptable in so far as it has been demonstrated to be a good measure of Intelligence A, but Intelligence B is too variegated to be scientifically useful, and indeed resembles in many ways popular conceptions of intelligence, as Sternberg indeed emphasises. He in fact welcomes this agreement with popular view, and explicitly disagrees with the notion that his conception of intelligence is over-inclusive. On this point readers will have to make up their own mind; I do not feel that popular ideas should determine scientific concepts, but opinion on this point may vary.

Some readers may query the very existence of Intelligence A, and take the view of Binet that intelligence is a statistical artefact, being merely the average of a number of independent abilities. Furthermore, they may argue that there is no evidence for "biological intelligence". Such a view would be very difficult to maintain nowadays. The two most recent studies of the genetic contribution to IQ tests, from the U.S.S.R. (see Eysenck, 1982) and Norway (Tambs *et al.*, 1984) respectively, give heritabilities of 78 per cent and 85 per cent, which agrees pretty well with the value of 80 per cent found by Fulker and myself in our reanalysis of all existing data (Eysenck, 1979). Thus clearly there is a powerful biological determinant behind intelligent behaviour, as measured by psychometric tests.

In recent years there has been additional proof for this, by psychologists who went back to Galton's original notion that intelligence could best be measured by physiological tests, and who suggested reaction time as one possible measure. Psychologists on the whole disregarded this advice, and preferred Binet's solution to the problem of measurement. I have suggested (Eysenck, 1967) that there was a good deal of evidence to support Galton's notion, and that speed of intellectual functioning, or information processing, was the vital biological component in intelligent behaviour. This notion was taken up by the Erlangen School in Germany, and by Jensen and his followers in the United States (Eysenck, 1985); a great deal of work done by them on simple and choice reaction time, inspection time, reaction time paradigms incorporating short-term memory and long-term memory, and various other similar paradigms has been used to correlate mental speed with IQ, and the outcome has been most impressive, with quite high correlations emerging. Indeed, these correlations of speed of reaction to very simple stimuli with psychometric tests of intelligence can be as high as those between IQ tests themselves, such as the Wechsler with the Binet. Such findings would be very difficult to explain in terms of such theories as those proposed by Sternberg.

It must be admitted that some of this material is of doubtful value. Some experimenters have used unduly wide ranges of ability, including severe retardates in their sample. Others have made the opposite mistake and worked with a very restricted range of ability, e.g. university students. When appropriate corrections are made, however, it can be seen that the average correlation between IQ and choice reaction time, variability of reaction time, inspection time, and the various short-term and long-term memory paradigms is around 0.5, rising to 0.7 when multiple Rs are used, or when correction is made for attenuation.

Even more interesting is recent work on genuine physiological measures, such as the event related potential on the EEG. Correlations between IQ and such evoked potential parameters as latency, amplitude and variability have been found to exceed 0.8 in several studies, and

although the paradigms used by such workers as the Hendricksons, Shaffer, Haier and others differ, there is now very little doubt that quite high correlations between IQ and physiological reactions to very simple stimuli do exist, and require an explanation (Eysenck, 1985). Such an explanation can hardly be found outside the concept of biological intelligence, and hence these results, very much like those on reaction time, support Galton's original view.

Findings such as these clearly contradict Sternberg's theorising, and certainly find no explanation in terms of triarchic theory. One would have expected a discussion of these findings, together with some hint as to how Sternberg himself envisages their fitting into his scheme, or the degree to which they are incapable of being so fitted. Unfortunately there is practically no mention of this work in his book. This is a second grave criticism which I think must be made of his approach. We cannot pick and choose, in our choice of data, accepting those we like to incorporate in our theory, and rejecting those we do not like because they would seem to threaten our conclusions. There may be ways of incorporating reaction time and EEG studies in Sternberg's general view, but at the moment I fail to see how this could be done. Failure to consider well established facts must therefore weigh heavily in one's judgments of the triarchic theory of intelligence. From my own point of view, the failures I have noted are fatal; the theory contributes to an understanding of human behaviour in general, but cannot be regarded as a theory of intelligence.

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