I.Q. and the Process of Cognition

Melvyn Freeman

The notion that IQ testing is pseudoscience and that tests are used as an instrument of, and as the rationale for, discrimination and racism is fairly well documented. Most of the critique of testing as pseudoscience has centered around four points: that 'intelligence' is not definable; that it cannot be operationalized and measured; that intelligence (whatever it may mean or be measured by) cannot be proved to be genetically transmitted; and that IQ tests are culturally biased. Yet though the criticism has had some impact on test use, the tests are still nonetheless used with the utmost regularity.

While it cannot be claimed that continued test use is <u>due</u> to insufficient - or the type of - criticism of IQ tests, it will be argued in this paper that most of the criticism has faulted by not offering an adequate explanation of what <u>is</u> being measured by an IQ test, and that in certain respects the criticism has inadvertently supported a questionable understanding of cognition. This paper will thus look at the conception of cognition which is implied by the testing movement, as well as in some of the criticism. An alternate view of cognition and how 'that which is measured by an intelligence test' fits into this understanding will be offered. It will be argued that the process of cognition and how it is acquired is fundamental to an understanding of 'intelligence'.

Psychology has stood accused on various occasions of being blinkered and cut off from other disciplines in the social sciences such as sociology, social anthropology and political science. Psychologists in the Soviet Union - notably Luria and Vygotskii - have altered this state of affairs to a large extent. It appears, however, that their influence is very slow

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in filtering into Western psychology. Certainly the field of 'intelligence' does not seem to have been affected by their work. Even in the 80's it must be presumed from the many articles and books produced around the topic of intelligence that either what these psychologists have written has nothing whatsoever to do with intelligence, or they have never been read. It will be argued here that 'intelligence' can only be fully understood if linked to a notion which examines the process of thought as outlined by these psychologists.

Inspection of the debates which are predominant in the field of intelligence show that the framework in which the majority of debates take place is a positivist one. Discrete variables are linked and correlated with a large proportion of research concerned with the measurement of variables which contribute to IQ score. Central to this has been the question "What proportion of which different variables goes to make up an IQ score have been genes and the environment - the old nature/nurture problem. Research is then conducted using sophisticated methodology and statistics to prove the contribution of each.

I will now briefly look at a study which has concerned itself with the 'contribution question', show how two critics of the study - one from a pro-genetic and one from a pro-environmental position - have interpreted the raw data of the original study, and draw out the view of cognition implied in both the study and critique. Anomalies of this view will be discussed later.

In order to separate genetic factors from rearing conditions so as to measure the affects of each, Scarr and Weinberg (1981) studied black and interracial children adopted by advantaged white families. The design was proposed as an analogue to the cross-fostering design common to animal behaviour genetics research. The question in this study was how well do IQ scores of black children reared by white families compare to white adoptees and the biological children of these parents? Results of the study yielded a heritability of around .45. Using Scarr and Weinberg's raw data, Jensen (1981) claimed that the heritability figure that should have been derived from this data was around .80. Amongst Jensen's criticisms of the original researchers' methodology were 'selective biasing', i.e. that technically eligible families did not volunteer for

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the study, that the use of partial correlations and regressions were wrong statistical choices, and that although Scarr and Weinberg's data does not prove .80 heritability, neither does it rule it out.

The same data under the scrutiny of Kamin (1981) were shown to be able to yeild a heritability of .0. According to Kamin, anomalies in the Scarr and Weinberg study included the fact that the researchers used educational level when referring to natural parents of the adopted children, whereas in the case of adoptive parents IQ scores were used; that black adopted children may not reap the home environment advantages that a white child would; and that the researcher's division into 'early adoptee' and 'late adoptee' at one year old did not take into account the differences between an adoptee at, say, one month old, and a child adopted at eleven months.

One could be tempted at this point to jump onto the bandwagon and consider which figure and which researcher is correct. Is the correct heritability figure from this data .45, .80, .0, or something else? Whose methodology is more correct, is it Scarr and Weinberg's, is it that suggested by Jensen, or is Kamin's proposed methodology the best? The response which I suggest to these questions is that no answer can be correct as, firstly, one is dealing more with value judgements than with facts, and secondly, it is the answer to a meaningless question. It is meaningless because a view of cognition which separates and measures variables is a false and distorted picture of cognition.

I shall deal only briefly with the first reason and then move onto the second, which will form the major thrust of this paper.

One of the major criticisms of positivism is that though it claims to be value-free, it cannot be. That value <u>is</u> operative is nicely illustrated by the three sets of results obtained by the three researchers above. If one looks at the theoretical positions held by the three researchers vis-a-vis the heritability question <u>prior</u> to the above study, one sees the following: Scarr and Weinberg (1981) had declared themselves moderates; Jensen (1969) had been the main advocator of a .80 herit - ability since 1969, and Kamin was in the forefront of the campaign which attributed an IQ score primarily to environmental factors. That the

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three researchers would take the same raw data and each empirically prove that their previously held positions were proved by the data seems to indicate that there is something more than objectivity involved when it comes to choosing methodology - and which data to include and which to leave out.

Now to the point of this paper. That separate variables make up an IQ and link to each other in the form Y = (f)(X) is a false notion (see Moll, 1983). Further to conceptualize the brain as having 'entities' which correlate directly with behavioural or cognitive manifestation is similarly false. Thus a view of intelligence which presumes either one of these is a distortion. I will now attempt to illustrate this by drawing from the work of Luria and Vygotskii.

Luria (1966) asserts that complex cognitive processes are organized 'functional systems' and not entities or capacities. The components are represented in different areas of the brain, but operate through a combination of different constellations, depending on the task at hand. But most importantly (for the arguement presented here), he states that neither the components nor the functional relations into which they enter are already formed at birth. Each individual's development forms through experience of their particular social environment.

> 'It is now generally accepted that in the process of mental development there takes place a profound quantitive reorganization of human mental activity, and that the basic characteristics of this reorganization is that elementary, direct activity is replaced by complex functional systems, formed on the basis of the child's communication with adults in the process of learning'. (Luria, in Simon, 1980, p.20)

Two points must be taken from this. Firstly the positivist assumption that variables which contribute to intelligence can be isolated, either in the brain or anywhere else, is an inaccurate assessment of cognition. And secondly, a crude environmentalism must be ruled out. The environment cannot cause cognitions. Rather, the development of cognitions, and this includes those cognitions measured on an IQ level test, involve relations. Vygotskii (1978) argues that the development of cognition involves relations between people, and between people and economic and social systems. In this view one is dealing with changing relations,

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and these are only understood when seen as a totality of interconnections with everything else. Thought itself is involved in dialectical relationships with everything around it and with its own progression. The pivot around which all relations take place is an economic one. It is primarily this which determines human consciousness.

> 'The mode of production of material life conditions the social, political and intellectual life process in general. It is not the consciousness of men that determines their being but, on the contrary, their social being that determines their consciousness'.

The mode of production, the historically changing economic system and the activity which takes place within it are crucial to the development of cognition. Through time, and in different places, productive activity varies and thus different 'styles' of cognition develop.

The view which sees social and economic relations as being fundamental is in sharp contrast with any of the answers given (above) to the issue of what proportion are genes responsible for intelligence compared to that of the environment. The two views are looking at the same issue - cognition - from incommensurable positions. Even the view which Kamin adopts here is incommensurable with the idea of cognition as social relations. Though he rejects the idea that the contribution to IQ score of either genes or the environment can be conclusively measured, and though he says that the onus is on those who say that IQ is heritable to prove this, he nonetheless takes a strong environmentalist (as opposed to a dialectical) stand.

> 'The data have repeatedly demonstrated profound environmental effects on IQ scores in circumstances where the genes cannot be implicated'. (Kamin, 1974, p.145)

Kamin's conception is a linear one. By entering into methodological debate within a positivist framework (as seen above), Kamin gives credibility to the question "What proportion of genes versus what proportion of the environment?" And, as has been said, the question is meaningless. Kamin attempts to prove that genes cannot be implicated to the extent which they are in influencing an intelligence test score by attempting to prove the effect of the environment. Yet while this

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approach has been useful to some extent, the impression is given that the environment 'acts on' the individual. Whether one sees heredity, the environment, or a combination of heredity and environment (the two-factor theory) as determining intelligence, there is no room for the person's own movement here. Simon says that one cannot

> '..... see the child as a given product (heredity) impacted (as it were) by a kind of global 'environment'. On the contrary, the child, by finding activity in the given circumstances, both changes his environment and changes himself ..... the major influence in a child's development lies in the nature of the activity - not in the 'environment' as such, but in the child's activity in that environment; in his relations with adults, other children, the school, natural and artificial (man-made) phenomena generally with which he is surrounded from birth. It is the activity which shapes (or determines) the child's development. (1980, p.21)

Intelligence is therefore not 'in' the person or 'caused' by the environment, but is developed, as is all cognition, through activity within the environment. Activity is crucial. It is "the most important initial methodological principle for explaining mental phenomena and the determination of consciousness." (Bueva, 1969, p.113) When researching cognitions then, social relations and the individuals' intentional actions (all embraced in the term activity) will be primary. This approach, says Bueva,

> exposes the essence of objects under investigation in their actual development, and explains the origin and functioning of mental phenomena in intentional activity, both individual and social. (1969, p.113)

IQ AND CULTURE

When one studies cognitions of people from different cultures, or examines their performance on IQ tests, differences are usually noted. For the purpose of this paper there are at least three ways in which such differences may be viewed. Firstly, as differences in genetic make-up; secondly as due to environmental differences and thirdly, as differences in activity within different socio-historical circumstances. I will now briefly examine three aspects of cognition, all of which have been regarded as forming part of intelligence: i.e.

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abstraction, perception, and logical reasoning, and consider them within the three alternate conceptions of cognition.

Abstraction

Amongst certain groupings the inability to abstract at the same level as western whites has led to the hypothesis that there are innate capacities which determine this. Jensen (1969) differentiated between innate 'Level 1' intelligence, which involved associative type role learning, and innate 'Level 2' intelligence, which involved 'higher' intellectual functioning, cognitions associated with 'abstract' thinking. There have been various studies which have proved the notion that abstract cognitions develop relatively independent of the environment as untrue. Some examples of this will be given.

A western individual usually develops cognitively in the following way. Classifications first take a 'perceptual' form such as colour, size, shape and position. This is followed by 'functional' classification in what things can do or what can be done with things, and finally to the groupings of these together under a common class name. The development does not move beyond the first or second classification amongst most non-industrialised people.

Western schooling has been claimed to be the crucial factor for developing the higher level of abstraction. Greenfield (1974), for example, found that Wolof children in rural Senegal who had attended school, be it in a city or a 'bush school', performed very similarly to a western child. Colour preference decreased with age in favour of form and functional groupings. The children who did not attend school rarely used super-ordinate language needed for 'higher' classification and in fact showed greater preference for perceptual classification as age increased.

However, the simplistic notion that schooling was the only factor in determining the development of abstract cognitions was challenged by Scribner (1974). She showed that not only schooling, but mere contact with Westernization, increased abstracting processes. A group of non-literate adults holding 'cash jobs' in a transitional-type village were able to use category groupings (though usually functional ones of the

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type needle, scissors, shirt), whereas those villagers who had not had this contact showed much more jumble (though according to Scribner there were indications of adhering to some other category influence). Certainly the 'type' of abstraction measured on an IQ test is specific to Western culture.

Perception

Herzkowits (1974) found that when he presented photographs to a group of people with no Western contact, not only was there no recognition of the representation (even though this may have been a picture of a close relative), but the people did not know what to do with the paper. Perception is certainly not a 'direct copy' of the external world, but mediated through the culture.

Perception of spacial relations ability were given to four groups by Berry (1971). The four groups, the Temne of Sierra Leone, New Guinea Natives, Australian aborigines, and eskimos varied widely in their ability. The reasons for this will be explored later.

Logical Processes

Luria (1971) found that responding to simple verbal syllogisms is a learned convention. In a study in Central Asia in the early 1930's, he presented two kinds of syllogisms to collectivised and uncollectivized peasants in the area. The one kind consisted of content related to the practical experience of the villages, whereas the other kind bore no relation to familiar practical life. The uncollectivized group were unable (or refused) to use a purely symbolistic conception. When the syllogism was related to their practical world they could answer, but not when pure syllogistic reasoning was required. On the other hand, where people had had even a small amount of schooling or who were engaged in a collective planning of farm production were able to see the syllogistic assumptions in order to draw conclusions. The same finding was recorded by Scribner (1974) using a variation of Luria's syllogism in a different population sample.

To what, then, should all the above differences be attributed?

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The genetic argument does not suffice for the following reason. The two samples given under 'abstraction' and the example under 'logical processes' both use as their sample subjects who presumably come from the same gene pool. The counter argument which may suggest that it was those individuals who had the greatest abstraction and logical reasoning abilities who went to school, became cash workers, or become collectivized, would surely be stretching a point too far.

The more difficult position to counter is the environmentalist one, i.e. that the differences found in the examples above are due to a different environment. Though this view may be able to behaviourally correlate and describe environmental variables which affect cognition, it cannot explain these differences. Besides, as has been repeatedly pointed out, the positivist position is a distortion of the way cognitions are developed. The person's own movement is not considered, nor are the social and economic relations which give rise to the cognition.

The position offered by Vygotskii, which takes a person as a relating aspect of totality, is able to explain the differences. When Vygotskii discovered that some people had not acquired advanced abstraction and logical reasoning, he argued that socio-historical circumstances determined that these people did not move beyond practical cognition. The lifestyle representative of peasant and many people from poor urban communities necessitated only manual labour, thus not needing and hence not developing more abstract cognitive processes. The activity of the children was not mediated by the adults to achieve abstract thinking. If we now return to the Berry study (under Perception), we are able to explain the differences found. The four groups measured on spacial abilities tests were ranked according to the importance of hunting in that culture. Results showed that increase in hunting requirements increased spacial abilities scores. The activity practiced developed the needed skill.

Positivist researchers have studied not only the effect of the environment, in its broadest sense, on intelligence, but have isolated particular variables such as motivation, nutrition, the test environment, etc. Now, while it is undoubtedly true that such factors may affect a test score, this means very little. One needs to ask "what is

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motivation, nutrition or the test environment linked to?" "How do they fit into the totality?" When one begins to see that motivation cannot be explained or understood unless related to class structure, then one sees the meaninglessness of its correlation with intelligence. Motivation is inextricably tied up with the possibility of occupational success and with the belief in one's own success on the test, and these are in turn inextricably linked to one's class position (or, in South Africa, racial group). The motivation of groups who have a high chance of personal and occupational success is likely to be much higher than groups which have a low success chance. Similarly with nutrition and test environment. Social and economic conditions are invariably behind lack of nutrition, or having fifty people crammed into a room without desks. Low IQ scores thus cannot be said to be a result of bad motivation or poor nutrition and test environment.

It should have become clear by now that research into intelligence, and critique of it which does not take the totality of the person into account, which isolates and measures separate variables, and which does not take the process of mental development into account when studying the subject of intelligence, will end up with a truncated and distorted idea of what intelligence is and how it develops. An intelligence test merely isolates in time and aspect, a 'piece' or a 'slice' of cognition. This 'piece' is no different in how it develops or what it is than any other 'piece' which could be isolated. The score on an intelligence test is, therefore, no more than a part of cognition which has developed in the process of social relations.

The central point of this paper has been to illustrate that it is the questions asked which determine results. When a researcher asks "What proportion of intelligence is contributed by the environment?" the answer can only range from .1 to .0. It is meaningless to answer this question with "the individual's activity related to the mode of production, one's class position within it, and mediation with adults." To arrive at this answer, whether the answer is correct or incorrect, requires a different question. When doing research into intelligence it is fundamental that the question one asks is not going to yield a number, but an explanation. 'Activity' rather than 'discreet variables' must be the starting point.

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