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THE EFFECT OF CULTURAL VARIABLES ON THE GOODENOUGH-HARRIS DRAWING TEST AND THE STANDARD PROGRESSIVE MATRICES

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ABSTRACT

The use of IQ tests cross-culturally has been questioned over a number of decades. Even the introduction of 'culture-fair' tests has not resolved the issue of whether to use the tests cross-culturally or not.

Whereas most research in the area of 'intelligence' and IQ testing has been concerned with the degree of influence that genetic makeup has on intellectual capacity compared to that of the environment, it may be argued (following Marx and Vygotskii) that cognitions (including intelligence) are socio-historical, dialectically acquired processes, and thus the gene/environment debate is asking the wrong questions. Furthermore the tests may be seen as 'ideological' rather than 'scientific' instruments.

In this dissertation four 'environmental' variables - urban/rural, ethnic group, sex and age - are located within a socio-historical context. The first aim of this study is to investigate whether differences in socio-historical conditions effects performance on two 'culture-fair' intelligence tests.

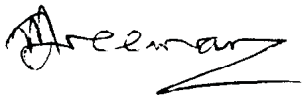
As different tests are not homogeneous it seems important to investigate whether different 'culture-fair' tests are effected to different extents within the same socio-historical framework. This forms the second aim of this study.

Two hundred and forty children from the Transkei, Vendaland and Soweto (divided equally by rural/urban, ethnic group, age and sex) completed two 'culture-fair' tests - the Goodenough-Harris Drawing Test and the Raven's Standard Progressive Matrices. Statistical analysis included analysis of Variance and t-tests.

Significant results indicate that socio-historical variables effect both dependent variables. It was also found that different variables effect the two tests to varying degrees. Conclusions are drawn concerning the continued use of IQ tests cross-culturally.

DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted in partial fulfilment for the Degree of Master of Arts in Clinical Psychology in the University of the Witwatersrand, Johannesburg. It has not been submitted for any degree or examination in any other University.



M.C. Freeman

fifteenth day of November, 1984.

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INTRODUCTION

The 'scientific' enquiry into mental ability which has centered primarily around IQ tests, is characterized by a fusion of academic investigation and practical use. Contrary to the logical positivist notion "psychometrics is not, and never has been 'pure', but always 'applied' knowledge" (Evans and Waite, 1981, p14). The crucial fact that millions of people's lives are affected by IQ tests, makes thorough and constant examination of them, of vital importance.

The IQ test has been 'used' on two levels. Firstly they have been used on the level of the individual. IQ tests are often part of the process which assigns pupils to class groups so as to form homogeneous units. They are used when determining which students should be excluded from regular school work and sent to special classes - or taken out of school altogether where no 'special school' facilities exist. They are used when advising people in selecting a vocation or choosing careers. They are used as a basis for choosing people for institutions of higher learning. They are often used in industry when selecting people into jobs and apprenticeships and they are used as an important tool in clinical, guidance and diagnostic procedures. The 'labels' which are fastened on to people from tests often have lasting effects.

The second level on which IQ tests have been, and are being, used is in terms of justifying educational and political policy (Blum, 1978; Evans and Waite, 1981; Simon, 1980).

Central to this thesis is the question 'Do IQ tests warrant continued usage?' (This question is being asked specifically within a South African context.) Firstly one may argue that the tests are 'scientifically justified' and should thus be retained. Secondly one may see the advantages as well as the disadvantages of continued test use and thus advocate use within limits and when used with caution and understanding of the tests' limitations; or thirdly one may see IQ tests as a "species of bourgeois rationalizations" (Lukacs, 1971) and thus they should be done away with.

The third option, which has been gaining prominence in Europe and the U.S.A. since the mid seventies *1, has had little support in South Africa. This view needs special and particular consideration in this country especially in view of the fact that people live and carry out their lives in, and from, diverse cultural settings and frameworks.

As a 'bourgeois rationalization' the IQ test can be

seen to be operating at (at least) three levels. Firstly, the tests have provided capitalism with a method with which to calculate the efficiency of labour and to isolate and 'objectify' attributes of the human worker. By measuring and categorizing people they become commodities which are negotiable in the labour market.

Secondly, intelligence tests have been used as a justification of societal hierarchies. This is epitomized in Herrnstein's notion of a 'hereditary meritocracy' (Herrnstein, 1973). This theory states that as social mobility becomes more democratic, stratification will be based more and more on ability and merit, which will above all else be represented by IQ scores. Thus those that are rich and powerful have got there through their superior intelligence and genes, and those that are poor or unemployed are in that position due to their inferior ability. The inequalities in ability are products of nature, therefore it is natural to have inequalities in all areas of living. The theory asserts that society benefits from the most responsible jobs being occupied by the most capable individuals. In order to attract the most capable people to the most responsible jobs, these jobs must offer greater salary and prestige. In this way the best individuals occupy positions where they are most needed.

But in order to use the IQ test to justify hierachies, it is not necessary to take the extreme genetic position that Herrnstein has. No matter what the reason is, the fact is that people differ in IQ performance. If it is true that society benefits from the most 'intellectually' equipped people occupying high status and high salaried positions, then this is the way things should be - for the benefit of society.

Thirdly, by 'proving' that whole groups of people are intellectually inferior, the capitalist is provided with a rationalization for securing cheap labour. In South Africa 'racial capitalism' is provided with a scientific backdrop. Again the reason for the inferiority is less relevant than the fact that it is so.

IQ tests have attained their prominent place in Western society couched in the logical positivist notion that the research around them has been objective and 'pure'. This belief, taken from research in the natural sciences, asserts that 'facts' exist in the world "entirely independent of human understanding, and provide the only reliable check on human thoughts." (Morrow; 1983, p. 35). In this theory 'facts' are observed and measured and laws are

developed linking discrete variables to one another in the form Y = (f)(x)*2. The policy of the investigator is not relevant to the investigation and social policy implications that one may derive from data are not inherent in the research results.

Since Binet developed the first intelligence test in 1905, thousands of studies have been conducted in this framework. The research has utilized tens of thousands of subjects and sophisticated techniques of analysis. The main issues which have been debated and redebated, researched and reresearched are those related to what intelligence is, whether it can be measured, to what extent it is inherited (if at all) and whether whole groups of people (e.g. blacks) differ in inherited intelligence from other groups.

Some eighty years later, though the tests have continued to be used, results of this research are still inconclusive. But more important than the lack of agreement between theorists is the observation that within these investigations, the results obtained seem to concur with the researcher's preconceived notions in relation to the issue!

Much less regularly than from within a positivist position, IQ tests have been examined from outside this framework. (e.g. Blum 1978, Lawler 1978, Simon

1978, Evans and Waite 1981). This position, instead of approaching intelligence as a capacity which is affected by different static variables to varying degrees [Y = (f) (x)], sees the 'process' of intellectual acquisition as paramount. And in preference to seeing IQ tests as independent of their use and ideology, they are looked at as instruments of 'technocratic rationality' (Habermas 1971). Investigation in this thesis, shall be conducted from this alternative point of view.

Taking 'intelligence' to be a 'capacity,' is in itself an ideological stance in that it promulgates categorization and objectification. (Lucaks, 1971) But if one follows Luria (1966) and Vygotskii (1978) one sees that the assumption that IQ is a 'capacity' is not only an ideological position but an inaccurate assessment of cognition. These psychologists perceive of cognitions not as 'capacities' but as developing dialectical processes. This involves relations between people, and between people and economic systems. Cognitions evolve through interactions and interrelations which take place within a socio-historical time and place. One does not 'have' an 'ability' or 'capacity,' rather it is thought that cognitions develop as a 'process', in the course of activity and within a particular setting. And the cognitions that one develops are those needed to

deal adequately with ones environment.

The ideological nature of the use of IQ tests have been briefly touched on (pg 2, pg 3). However ideology does not begin when tests are used to justify policy, the political process begins long before this. Policy precedes the test and is largely responsible for the type of test devised and for the uses that are to be made of it. Thus a circularity is developed. Policy precedes the test and the test is then used to justify the policy. This cycle has been utilized throughout the history of mental testing. It began with the generally recognized 'father' of mental testing, Sir Frances Galton, in the latter part of the nineteenth century and a similar, though more subtle, process has been operative since. Galton wanted to show that higher and lower classes as well as 'superior' and 'inferior' races were due to innate differences. He felt that if he could prove this mathematically he would have justification for the practice of 'eugenics'. Galton's a priori assumption that certain people are innately superior dictated his methodology. His 'proofs' rested on such evidence as noticing that close relatives of eminent people have a much better than average chance of being eminent themselves. (He himself was a cousin of Darwin!) From evidence such as this he concluded that talent and genius were both hereditary.

As 'scientific' methods in the behavioural sciences grew and showed up Galton and his associates to be pseudoscientists, a new theory needed to be developed with scientific credence which would justify the existence of 'superiors' or 'haves,' from 'inferiors' or 'have nots', both within and between races. Modern meritocracy (capitalism), it appears, needed a modern scientific backup and this was provided in the form of the IQ test. (Blum, 1978).

It appears that at all times ones 'extra-research' theory plays a part in the design of an experiment and that by selective reporting or different usage of data, diverse conclusions may be reached - even from the same data. (see ch. 4) The claim that IQ tests can ever be value free is false. As Evans and Waite say:

> technocratic rationality always entails, though rarely acknowledges, social and political direction and domination, for it limits the choices which can be made amongst political, social or educational policies, and prescribes the 'correct' strategies to be adopted.
> (1981, pg 14)

If Vygoskii's notion, that socio-historical context is largely responsible for cognitive 'style,' is accepted, then one can similarly use this explanation when looking at differences in IQs between groups.

One then simply argues that the 'style' developed in some cultures to do well on an intelligence test is not as well developed as in others.

This of course brings into question what 'intelligence' is and this will be dealt with in Chapter 1. The point at this stage though is that if cognitive style is developed within a socio-historical context, and if different IQ tests differ radically in their content and their approach needed to answer them, then it is probable that different socio-historical contexts encourage the 'style' needed to do well on one IQ test but not on another. The fact that there is a fairly high correlation (an average of around .51) between IQ tests in a western white population does not necessarily imply that the tests are measuring similar entities. All it may mean is that the cognitions developed in that culture to do well in one test have been developed in another cognitive area to a similar extent. (The correlation between tests is hardly surprising in the light of the fact that part of the validity criteria of a test, is that it compares favourably with other IQ tests).

Thus the broad aims of this study are firstly to examine the effects of cultural variables on IQ from a socio-historical perspective. And secondly, to investigate whether different socio-historical

circumstances would result in subjects scoring substantially differently in 'intelligence' when measured on two different tests which seem to require different 'styles' of cognition.

The Goodenough-Harris Draw-A-Person test (DAP) and the Raven's Standard Progressive Matrices (SPM) are two well-known and widely used Intelligence tests. By definition, then, both lay claim to measure 'intelligence'. In common, these tests, according to their manuals, are both non-verbal, both can be administered in groups, both have little relation to academic subject matter, and at various times have been said to be "culture-fair" tests. (see pg. 130 - 135) Sattler says that the DAP measures "conceptualization involving perception, abstraction and generalization" (1981, pg 367), while the SPM requires an analytical approach in which one applies logical operations and where one is required to form visual perceptual Gestalts (Sattler, 1981). Though there is a slight discrepancy between the two tests in what is meant by 'intelligence' in that they measure slightly different things, there is a very strong relation between the type of cognition claimed to be needed for both.

Contrasted to this is the 'outward' appearance of the tests. The DAP requires the testee to merely 'draw a

person' while in the SPM the testee is required to choose from six or eight alternatives, a piece which is missing in sixty matrices or designs.

Thus though both tests are tests of 'intelligence' it is hypothesized that different cognitive styles would effect the two tests differently.

There are numerous socio-historical variables which one could hypothesize would effect cognitive style and hence IQ tests. This thesis will limit itself to four such variables: Urban/rural, ethnic group membership, sex and age. The South African situation offers a unique opportunity to investigate the effects of different 'cognitive styles' as there are still rural groupings existing relatively near to their traditional lifestyles, but there is also a "melting pot" i.e. the urban areas, where people from different traditional cultural environments have come together and are exposed to very similar influences. The four variables chosen here are not considered as static entities which have quantitative effects on IQ ability, but as dynamic, historically determined influences which effect cognitive <u>processes</u> .

The format of this thesis will thus be to initially examine the 'IQ debate' relating to "the nature of intelligence" (Chapter I) and the "heritability

question" (Chapter II). Many of the positivist "conjectures and refutations" will be outlined. It will be shown that in using this method alone there is sufficient doubt to seriously question the continued use of the IQ test. These issues will also be examined from 'outside' this framework and it will be seen that the ideological position of the researcher plays a much greater part in the research than any positivist is prepared to admit.

The emphasis of this thesis will then move away from the "IQ controversy" as such, and look at the acquisition of cognition and "the process of thought" (Chapter III). Here the socio-historical influences on cognition will be looked at from a general position. The following chapter (Chapter IV) will deal with 'IQ and ideology' and illustrate how the positivist conception of intelligence as a measurable and practically measured capacity has been developed and used for the benefit of capital.

The aims of the present study and the particular socio-historical circumstances of the subjects used, are then outlined. This is followed by a description of the present research project. The results of this study are then discussed and finally conclusions, particularly related to the continued use of the IQ test, are drawn.

****

CHAPTER I

THE NATURE OF INTELLIGENCE

1.1 What is intelligence?

As IQ tests are so commonly 'used', one would have expected that the minimal requirement for such use, would be that test designers and users would have knowledge of what they are testing. This fundamental prerequisite is lacking. It appears that 'intelligence' is something which 'the person in the street' has little difficulty understanding. The meaning which the 'lay-person' has of intelligence is probably not incidental or random but a result of a concerted effort to portray a scientific image of the concept by psychologists operating within a particular framework. (This will be discussed in Chapter IV). A reflection of a lay definition is the one found in the Collins New English Dictionary (1978). Intelligence is "inborn quickness of understanding and adaptability to relatively new situations" and "that mental power or ability which can be measured by psychological tests" The assumptions in the definition are that:-

(a) Intelligence is inborn,

(b) Intelligence is "quickness of understanding and adaptability to relatively new situations,

(c) What is measured by an intelligence test is

'intelligence',

(d) That which is measured by an intelligence test is (by inference) "inborn quickness of understanding and adaptability to relatively new situations."

'Expert' definitions are similarly laden with assumptions and anomalies. Some of these definitions which have been prominent over the last eighty years will now be outlined. This will be followed by a resumé of criticisms of them.

Binet: the capacity to judge well, to reason well, and to comprehend well.

Terman: the ability to carry out abstract thinking.

Boring: the capacity to do well in an intelligence test.

Stoddard: the ability to undertake activities that are characterized by difficulty, complexity, abstractness, economy, adaptiveness to a goal, social value, emergence of originals, and to maintain such activities under conditions that demand concentration of energy and a resistance to emotional forces.

Burt: innate general cognitive ability.

Wechsler: the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with the environment.

Vernon: the outcome of the interplay of innate potentiality and of such conditions as good emotional adjustment and appropriate educational stimulation.

Though there are so many definitions they all suffer from some weaknesses. Samuda (1975) points out firstly, that the definitions are often vague, needing definitions of the explanatory terms which without becoming circular explanations, are indefinable. Secondly he says that over emphasis is placed on abstract reasoning ability. This quality may indeed be relevant to some societies but then 'intelligence' by definition becomes culture-bound. Alternatively it makes a priori suppositions that cultures using abstract thought are more intelligent. Added to this, if, as in Wechsler's definition, for high intelligence one needs the ability "to deal effectively with the environment" then provision for the ability to wield a whip for herding cattle or to throw a boomerang would

need to be included, instead of abstract reasoning ability as an 'intelligence' criterion. Thirdly, though an IQ test measures 'intellectual behaviour', what is presumed is an underlying 'capacity'. The term intelligence has been reified. By making 'intelligence' a noun it is made out to be something real, tangible and concrete (like a quantity of something in the brain). Pyle (1979) suggests that a more correct usage would be as an adjective i.e. intelligent behaviour, then what is reflected is a way of acting and not something that a person <u>has.</u>

Lawler (1978) criticizes the idea of intelligence as 'capacity' as it carries with it the (dominant) notion that IQ score is fixed and should not vary (or vary very little) during development, say from age five, through school and into adulthood. His view is that 'intelligence' is not static, but rather a progressive development of thought.

> We may be tempted to think that as we passed from one primary school grade to another, and from primary to secondary school, we were continually developing our intelligence. We may think that higher education opens up even broader horizons for the development of our minds, and that learning can develop throughout life (1978, pg 16).

For Lawler the only way that 'intelligence' has been able to assume a 'static capacity' framework is through an a priori definition. The notion that

intelligence is fixed came befors its proof, and it was only through an operational definition that it has obtained the status that it has. Lawler sees it as more logical (and scientific) to see intelligence as a dialectically acquired function which is paralleled by the acquisition of knowledge. (See Chapter 3)

Finally, some of the definitions can be regarded as simply incorrect, depending on ones point of view. For instance, that intelligence is innate or inborn (e.g. Burt) is far from a veriffed fact.

To be sure, what 'intelligence' is, is uncertain.

1.2 Do IQ tests measure intelligence?

The fact that there are disagreements, arguments and general uncertainty about what intelligence is, has not, it seems, necessarily been a deterrent to many IQ theorists. Jensen for instance writes "There is no point in arguing the question to which there is no answer, the question of what intelligence really is" (1969, pg 5 - 6). Instead, he says one can take an "operational" stance and define intelligence by the way we measure it, whatever it is. In fact "intelligence by definition is what intelligence tests measure" (Ibid pg. 8 - Jensen is citing favouraoly Edwin Boring).

In effect he jumps over what is being measured and ends up with a measurement of "something" from intelligence tests and calls this in circular fashion "intelligence." Eysenck, who parallels Jensen's position, seems to think it an audacious question when theorists like themselves who hold such views are asked how they know that their measurements reflect something existing outside these measurements. "This of course is an impossible question ....Intelligence is not a 'thing' but a concept - just as gravitation is a concept, or heat" (1973, pg 46). It seems that he thinks that by merely drawing analogies from the physical sciences, their blind leap becomes excused.

> At the time the thermometer was invented there was little in the way of scientific theory regarding the nature of heat or its measurement. The measurement of temperature was not derived from an advanced theoretical analysis of heat: rather the modern theory of heat was very much a result obtained through the use of the thermometer and other instruments. (Eysenck, 1975, pg 10).

The analogy does not hold however. Eysenck's analysis of the development of the kinetic molecular theory of heat and the associated laws may well be correct, but he does not thereby prove the similarity between a thermometer and an intelligence test. The crucial difference between a thermometer and an intelligence test is that, the one is pre-existent and the other is contrived and formulated. A retort to this might be

that a thermometer is as contrived an artifact as an intelligence test in that the thermometer is calibrated and encased. Nevertheless this is a secondary feature to the main criterion by which a change of heat is inferred, which is the change in volume of the substance contained. In contrast, the intelligence test is wholly 'contrived' meaning that the criteria by which intelligence is to be measured is 'defined' rather than 'discovered'.

The operational definition of intelligence has a further related problem. Engels describes the operational method as:-

> the old favourite ideological method, also known as the a priori method, which consists in arriving at properties of an object deductively, from the concept of the object instead of from the object itself. First the concept is formed from the object, then the spit is turned round, and the object is measured by its image, the concept of it. The object is then made to conform to the concept, not the concept to the object.
> (Engels, 1966, pg 106).

IQ tests are a way of giving outside 'form' to the phenomenon 'mental capacity'. But because the 'reality' cannot be measured, the spit is turned around and "real intelligence" is made to fit the concept (which was a subjective formulation in the first place). The concept then becomes the accepted basis for measuring the reality. This circularity is the recipe for a 'dead-end' situation and is the

result, says Engels, of metaphysical rather than dialectical scientific thought. Though conceptualization is a necessary phase in the history of a scientific phenomenon, progression can only proceed if there is a "reality" and a sound theoretical explanation that exists outside of its operational definition (as is the case with studying heat). With intelligence, what has happened, is that there has been no movement away from the operational definition to a study of the reality independent of the test, but rather, the theory claiming to grasp it, has been able to obscure the 'reality' more and more. There would seem to be two main reasons why this has happened. Firstly, a greater approximation of the 'reality' is not forthcoming because there will never be a way of measuring it, and secondly its ideological nature has managed to carry it in its ideological momentum. (see Chapter IV)

As Jensen has been forced to admit that there is no answer to the question of what intelligence <u>really</u> is, he attempts to demonstrate that it does exist, by asserting:-

> The best we can do is to obtain measurements of certain kinds of behaviour and look at their relationships to other phenomena and see if these relationships make any kind of sense or order. It is from these relationships that we can gain some understanding of the phenomena (Jensen 1969, pg 6).

The relationship which has been used vociferously to illustrate his point is the one between IQ and scholastic achievement. The first correlation was discovered by Lewis Terman in 1919 and many subsequent studies have obtained results similar to the original ones.*3 The correlations have tended to vary from around .4 to around .6. However these correlations are far from surprising and tell us nothing about intelligence whatsoever. Firstly the test type situation of IQ testing is very similar to the test type situation from which school results are obtained. There is no reason to believe that the correlation between IQ and scholastic achievement is not merely based on ability to take tests. Secondly IQ test items are as a rule not far from the type of questions pertaining to the school environment. Thus ability to do well at school would be <u>expected</u> to correlate with IQ score without telling anything about "mental capacity".

The early psychometrician's belief was that ability in school would be reflected in subsequent intellectual endeavours. Their research methods managed to show this to be correct. The Barr-Scale for instance was a highly respected instrument in 'proving' that IQ correlated with occupational status. A short examination of this shows it up to be ludicrous. It

was drawn up by asking 30 judges to rate on a scale of 0 to 100 the intelligence they thought was required by various occupations, and it was found that the judges agreed fairly closely in the intellectual demands of the occupations. The quantitative results containing a .91 correlation, made the study look scientific and respectable to the people at that time. The fact that the only thing the study showed was that the judges had similar (indoctrinated?) preconceptions about the relation of intelligence to occupation was not seen. Other studies such as those by Cox and by Terman *4 were equally absurd.

If Jensen and associates want to adhere to their "relations or correlations" as proof that IQ tests were measuring intelligence in a more scientific way than Barr went about doing things, then they would need to demonstrate three things:

(1) People with higher grades in school will perform better in occupations, since differences in general intelligence should underlie both sorts of performance.

(2) Among those with similar class background and equivalent educational levels, those with higher IQ scores will get better jobs and make more money than those with lower scores.

(3) Within a variety of professions people with higher IQ scores will perform better than those

with lower scores.

None of the three appears to be correct. Of the first Hoyt (1965) reviewed the relevant literature and summarized the results of about forty separate studies which correlated college grade average with different measures of occupational performance. Of twelve studies which examined teachers' performance, the majority found no relationship between college grades and measures of teaching success, while the other studies showed low correlations. Of seven studies of success in business (mostly using income as a measure) only one found any relationship between it and college grades. Of five studies of engineers, only one reported a positive correlation. No correlation was found between medical undergraduate grades and doctors performance. Other correlations found by Hoyt were more or less the same as these mentioned. It doesn't seem to matter what measure is used for performance, be it peer ratings, supervisors ratings, direct measures of productivity or income, correlations still remain at most very weak. Hoyt's review also showed that the majority of "important people" in America had college grades averaging about "B" or "C+".

The notion that IQ scores manifest in income and occupational status, with social class background and educational levels controlled, has also proved to be untrue. Studies by Bowles and Gintis (1972); Bowles