

Progress and Degeneration in the 'IQ Debate' (II)

by PETER URBACH

3 THE DEGENERATION OF THE ENVIRONMENTALIST PROGRAMME

(a) *Explanations of IQ Differences in Terms of Socio-Economic and Cultural Factors.*

The hereditarian programme makes no predictions concerning the relative average intelligence of different racial or social groups. It is perfectly consistent with any observed differences (or lack of them) in IQ between different groups. The environmentalist programme, on the other hand, predicts that all groups will be *equal* in innate mental ability; any IQ differences which cannot be explained by environmental factors are consequently anomalies.

In this section I shall discuss some environmental theories which have been used to explain the origins of observed racial and social differences in mean IQ. No doubt many environmentalists will repudiate the idea that some of the environmental theories I discuss were ever part of their programme. But these same environmentalists would surely have claimed victories for their programme had these theories provided progressive explanations for the group differences in IQ.

Environmentalist theories explaining observed group differences in average IQ have consistently lagged behind the facts and auxiliary hypotheses proposed to rescue these theories when their predictions have failed are all *ad hoc*. Occasionally the environmentalist programme has scored some predictive success, but whenever this has happened, hereditarians have caught up and superseded them by reinterpreting the observations within their programme in a non-*ad hoc* way.

Environmentalist attempts to explain the observed differences in average IQ between social classes and between American blacks and whites have sometimes used the auxiliary assumptions (i) that the quality of education which an individual receives significantly affects the score he gains on an IQ test and (ii) that Negroes and lower class children are more likely to attend schools where facilities are relatively inferior in quality.

The influence of education on a child's IQ was tested by Gordon in his [1923] studies of canal-boat children. These children received no formal education and the environmentalist theory predicted that they would not

only have a very low IQ but also that their IQ's would fall as they grew older and lagged further behind in their education. This theory was corroborated. Gordon found that the children had an average Stanford-Binet IQ of only 70 and he also discovered a strong negative correlation between IQ and age.

Hereditarians, however, successfully dealt with this anomaly by the auxiliary assumption that the Stanford-Binet test was 'culture biased' against the canal-boat children because of their extreme cultural isolation and was thus not a true measure of their intelligence. The experiment was repeated using a test of intelligence which required no ability to read or write. And, indeed, the canal-boat children now scored an average IQ of 82. Moreover, there was a slight *positive* correlation between IQ and age.¹

While educational deprivation may be the cause of low IQ scores in some extreme cases, such as that of the canal-boat children, several investigations have refuted the theory that prevailing differences in school facilities are responsible for the observed overall racial and social differences in IQ scores. In by far the largest investigation of possible influences of the quality of a school's facilities on the intelligence of its pupils, Coleman *et al.* found that for each racial group, most of the variation in IQ scores occurs *within* schools and that less than 20 per cent occurs *between* schools.² Moreover, Coleman predicted that 'if these variations [in IQ between schools] were largely a result of either school factors or community differences in support of school achievement, then the school-to-school differences would increase over the grades in school'³. This prediction was not corroborated. Coleman found that there was no significant change in school-to-school variation in IQ between grade 1 (when children were tested shortly after they had started school) and grade 6.⁴ In another large study of Californian schools which refutes the environmentalist hypothesis, negligible correlations were found between IQ and expenditure per pupil, teachers' salaries, pupil/teacher ratios and the number of school administrators.⁵ The results of a further investigation of 900 New York schools showed that, in contrast with environmentalist predictions, there was a strong *negative* correlation between average expenditure per pupil and the average IQ of the pupils.⁶

Halsey has attempted to explain the origin of social class differences in average IQ in terms of the superior cultural and material circumstances enjoyed by the higher classes.⁷ But, as Conway points out, Halsey's environ-

¹ Gaw [1925], p. 390.

² *Ibid.*, p. 296.

³ Jensen [1971].

⁴ Halsey [1958]. Actually Halsey tried to incorporate an environmentalist account of social class differences into the hereditarian programme. He accepts that up to 75 per cent of the variation in individual IQ's is due to genetic differences and conjectures that the 25 per cent of variation which can be attributed to environmental differences goes largely into causing social class differences.

⁵ Coleman *et al.* [1966], p. 296.

⁶ *Ibid.*, pp. 296-7.

⁷ Cf. Gittell [1971].

mentalist explanation of class differences in IQ is inconsistent with the observation that despite the considerable social and material improvements which took place in the period 1922–50, there was a slight *drop* in average IQ, from 98.3 to 97.1, amongst the children of skilled and unskilled workers in London in this period.¹ In order to deal with this anomaly, Halsey has disputed that the circumstances of the working classes have improved *significantly*. He suggests that 'it is necessary to entertain a sophisticated view of the notion of class environment'². Halsey also goes on to explain that 'this is not simply a matter of crude material differences, but a *complex pattern of attitudes, aspirations, etc.* about which we still know far too little'³. The original environmentalist explanation of class differences in terms of *specified* environmental disadvantages has now turned into the 'sophisticated' phrase that these classes have a different and '*complex pattern of attitudes, aspirations, etc.*'⁴ This phrase is empirically empty and, indeed, a standard pseudo-scientific manoeuvre of environmentalists. If an hypothesis is contradicted by an anomaly it is intellectually improper to obscure this fact by adding the trivial truth that the world is complex.

Donald Swift also regards Conway's contention that the circumstances of the working classes have improved during this century as untenable because it assumes that the environment consists of discrete variables external to the individual. Apparently the 'sociological perspective leads . . . to [the] . . . much more complicated view'⁵ that 'the environment of an individual is in his head'⁶. One wonders what empirical observation would contradict this, certainly unusual, theory.

The assumption that the difference in average IQ between American blacks and whites has its origin in environmental factors connected with socio-economic status has also been tested by matching black and white children for socio-economic status and the geographical area of their homes to see whether these groups would have the same average IQ's. The results of such experiments show that groups matched in this way still have large, although somewhat reduced, IQ differences.⁷ More significantly, it has been found that black children in the top socio-economic group still performed, on average, slightly less well than children of whites of the lowest socio-

¹ Conway [1959], p. 11.

² Halsey [1959], p. 2.

³ *Ibid.*, p. 2; my italics.

⁴ *Ibid.*, my italics.

⁵ Swift [1972], p. 154.

⁶ *Ibid.*, p. 156.

⁷ For a review of these studies cf. Shuey, *ibid.*, pp. 518–20. Since IQ and socioeconomic status are positively correlated, groups of children matched for socioeconomic status will also be matched to some extent with respect to their parents' IQ's (cf. e.g. Jensen [1972a], pp. 235–42). The hereditarian programme therefore *also* predicts that these groups will have smaller average IQ differences than unselected groups, and this result therefore is not a 'severe' test of the rival programmes. (For the concept 'severity of a test', see Popper [1963], p. 388.)

economic group.¹ This last observation is an anomaly for the environmentalist programme, because the same observation is easily explained in hereditarian terms if one assumes that both black and white parents in the top socio-economic class have similar average IQ's and that their children regress to different population means.²

I argued earlier³ that an important aspect of the heuristics of each of the two research programmes is to try to invent new tests of innate intelligence if a particular test which was originally conjectured to be satisfactory turns out to produce anomalous results. Some environmentalists have carried out this part of their programme. In particular, they conjectured that standard IQ tests, such as the Stanford-Binet test, are 'culture biased' against members of the lower socio-economic classes because 'they do not use problems which are equally familiar and motivating to all such groups'⁴ and because they only test a person's 'familiarity with, and training in, middle class linguistic culture'⁵. In an attempt to construct a test not biased in this way, considerable effort was made to select only those types of problem which are 'part of the basic American culture, [and which are] . . . learned relatively as often in all socio-economic and cultural groups'.⁶ The suitability of test items was checked by observing children from different social groups in school, at play and in family situations⁷ and the problems were couched in symbols which were ascertained, after interviews with children, to have equal familiarity and significance for all social groups.⁸ When the resulting 'culture fair' test, the so-called Davis-Eells Games, was used, the social class difference in performance was not significantly different from that found with conventional intelligence tests.⁹ Moreover, no other 'culture fair' (that is, non-verbal) test has succeeded in eliminating the class difference in performance.¹⁰

When culture fair tests are administered to Mexican Indians their scores rise significantly and approach the scores of American whites. This effect is just what is predicted on the assumption that the culture bias of conventional tests prejudices the performance of non-white groups. On the other hand, contrary to the environmentalist prediction, American Negroes do rather *better*, on average, on culture bound than on culture fair tests.¹¹ Some

¹ Cf. Shuey, *ibid.*, pp. 519-20, for a review of the relevant studies and Jensen, *ibid.*, pp. 239-40 and pp. 241-2.

² Cf. *above*, section 2(d) (Part 1), for the same phenomenon exhibited amongst siblings.

³ Cf. *above*, section 1 (b) (Part I). ⁴ Davis [1949], p. 48. ⁵ *Ibid.*, p. 83.

⁶ *Ibid.*, p. 69. ⁷ Eells *et al.* [1951]. ⁸ Davis, *ibid.*, p. 66. ⁹ Altus [1956].

¹⁰ Cf. MacArthur and Elley [1963]. For a discussion of the Davis Eells and other 'culture fair' tests, cf. *e.g.* Freeman [1963].

¹¹ Cf. Shuey, *ibid.*, pp. 256-8, McGurk [1967], and Coleman [1966], p. 20. Attempts to explain the fact that Negroes, on average, perform better on culture biased than on culture fair tests have contributed to a significant problem shift in the hereditarian

environmentalists try to account for this anomaly by suggesting that the culture fair tests were not *really* fair.¹ But in order for this assumption to be testable rather than a mere verbal quibble, these environmentalists must specify wherein the bias lies and test their assumption by constructing new tests which are not biased in this way. So far, this has not been done.

The assumption that social class differences in IQ arise through the beneficial surroundings which higher class parents provide for their children was tested in a well-known experiment carried out by Skodak and Skeels.² The result of this experiment is often hailed as a victory for the environmentalist programme, but I shall argue that, on the contrary, when these results are taken as a whole, they *refute* environmentalist predictions.

In the Skodak and Skeels study it was found that the average IQ of some adopted children was 106, while their biological mothers had a mean IQ of only 85.5. Now on the assumption that the fathers of the children had average IQ's, the hereditarian programme anticipates that the children will have IQ's of about 93. This result is therefore an anomaly for the hereditarian programme. Hereditarians have attempted to deal with the anomaly with several auxiliary assumptions. (i) It is conjectured that the fathers' IQ's had been underestimated since they had not been measured and for many of them no information was available even concerning their educational levels.³ (ii) It is suggested that the children were not a random sample of children of low IQ mothers but were specially selected as suitable for adoption.⁴ (iii) It is conjectured that since the IQ's of the mothers were assessed at an emotionally stressful period around the time of the birth of their child, these may be lower than their true IQ's.⁵ None of these conjectures has been independently tested, and they are therefore all *ad hoc*.

Although the results of the Skodak and Skeels study are anomalous for the hereditarian programme, Jensen argues that the IQ bonus acquired by the foster children through their favourable surroundings is simply a repetition of the *old* anomaly that available IQ tests fail to tap more than about 80 per cent of inherited general intelligence. More particularly he argues that if 20 per cent of variation in test scores is caused by environmental variation then an IQ increase close to the one observed is expected since the foster parents 'were at least 1 standard deviation above the general

programme. It has been suggested that there are at least two different, although correlated, types of mental ability. Level I is an associative or rote learning ability, while Level II is an abstract reasoning ability. Both types are held to be inherited. Negro children whose scores are much lower than whites on tests of Level II ability, nevertheless score equally well on tests of Level I ability. Cf. Jensen [1970a].

¹ Cf. e.g. Ryan [1972], p. 53.

² For the final investigation in this longitudinal study see Skodak and Skeels [1949].

³ McNemar [1940], pp. 75-6.

⁴ Jensen, [1972], p. 17.

⁵ McNemar, *ibid.*, p. 75.

average in socio-economic status and were *probably* even higher in other qualities deemed desirable in [such] . . . parents'.¹ But Jensen's explanation is *ad hoc* because it fails to specify the nature of the other desirable qualities which the foster parents 'probably' possessed. Moreover, Jensen's explanation is inconsistent with evidence brought forward by hereditarians concerning the nature of the environmental influences on IQ test results. First, it may be deduced from correlations for IQ of pairs of twins and siblings that, on average, about half of the variation in IQ-relevant environments occurs *within* families.² It is therefore unlikely that these IQ determining environmental variations are connected with the cultural and material differences which exist between the social classes. Secondly, after reviewing the evidence that significant IQ determining factors step in during the first stages of cell-division in the development of monozygotic twins, Jensen concludes that 'a substantial and perhaps even a major proportion of the non-genetic variance is attributable to prenatal and other biological influences rather than to differences in the social-psychological environment'.³ If most of the 20 per cent of the non-genetic contribution to IQ variation arises from biological influences, it is difficult to see how foster parents could make much impression on their adopted children's IQ's.

Thus, *pace* Jensen, the results of the Skodak and Skeels study present the hereditarian programme with a new, unresolved anomaly. However, when the results of the study are taken as a whole, they also disconfirm environmentalist predictions. The prediction that the adopted children would, despite their lower class origins, have IQ's typical of the middle class was based on the assumption that there are major IQ-determining environmental factors correlated with social class. However, this assumption was refuted in the Skodak and Skeels study where there was *no* significant correlation between the occupational class of the adoptive fathers and the IQ's of their foster children. Moreover, there was *no* significant correlation between the children's IQ's and their foster parents' educational levels,⁴ a result which has been corroborated in independent studies of children and their foster parents.⁵

Skodak and Skeels recognised that the high IQ's of the adopted children could not be attributed to the educational or occupational levels of the adoptive parents and they concluded that '*other factors*, primarily emotional and personal, and *probably* located in the foster home, *appear* to have more significant influence in determining the mental growth of the child'.⁶ Under-

¹ Jensen [1973*b*], p. 406; my italics.

² Jinks and Fulker [1970].

⁴ Skodak and Skeels, *ibid.*, pp. 108–9.

⁶ Skodak and Skeels [1949], p. 116; my italics.

³ Jensen [1970*b*], p. 144.

⁵ Cf. e.g. Honzig [1957] and Burks [1928].

lining the *ad hoc* nature of this explanation, they add that 'unfortunately, there is still no scale for the measurement of these dynamic aspects of the foster home situation'¹.

As I have already remarked, the hereditarian programme makes no predictions about the relative degrees of intelligence of different racial groups. It takes the IQ values obtained on the 'best' IQ tests as estimates of the true average intelligence levels and proceeds from there to make predictions about persons of known genetic relationships. On the other hand, with the auxiliary assumption that general cultural and socio-economic factors are the most important IQ-determinants, the environmentalist programme predicts that Negroes will, on average, have higher IQ's than American Indians since the latter are disadvantaged relative to the former on a large number of cultural and economic indices frequently considered important by environmentalists.² By the same criteria, American orientals should, on average, be less intelligent than whites.

All these environmentalist predictions are controverted by the findings that the order of average IQ ratings of these different groups is: Oriental > White > American Indian > Negro.³ Thus the comparison of Negroes' and American Indians' IQ's yields a major anomaly for the environmentalist programme. John Rex claims that these results should not be interpreted as anomalous for the environmentalist programme because they fail 'to analyse the structural situation of the American Indian in a reservation and an urban Negro'.⁴ But Deutsch's contention that there is a 'greater degree of structured environmental deprivation within the American Indian community than within the ghetto'⁵ if correct, implies that there is no hope for Rex's sub-programme. Deutsch attributes the relatively superior performance of Indians over Negroes to the 'qualitative differences between environments . . . [which] are *probably* highly relevant to any discussion of environment-behaviour relationships'.⁶ In particular, Deutsch points to 'the *special* conditions of American Indians: their history, their current social organisation, and their schooling'.⁷ This explanation is, in its present form, sufficiently vague to be safe from the dangers of any future test. Another environmentalist, Crow, believes that the interpretation of Negro-Indian

¹ *Ibid.*, p. 116

² The group of American Indians which Coleman *et al.* investigated in their [1966] studies were further below Negroes than the Negroes were below whites on the following environmental measures: (1) reading material in the home, (2) cultural amenities in the home, (3) structural integrity of home, (4) foreign language in home, (5) pre-school attendance, (6) encyclopaedia in home, (7) parents' education, (8) time spent on homework, (9) parents' educational desires for child, (10) parents' interest in school work, (11) child's self-concept (self-esteem), (12) child's interest in school and reading.

³ Coleman *et al.* [1966], p. 20.

⁴ Rex [1971].

⁵ *Ibid.*; *my italics*.

⁶ Deutsch [1969], p. 536; *my italics*.

⁷ *Ibid.*, p. 573; *my italics*.

differences in IQ as genetic in origin is unacceptable since 'some environmental variable *associated with being black* is not included in the environmental rating'.¹ Crow needs only to equate this 'environmental variable associated with being black' with the possession of a lower IQ, to complete the circle.

The environmentalist assumption that socio-economic and cultural factors play a large part in influencing IQ's is also refuted by the fact that Eskimos living in the Arctic Circle have slightly *higher* mean IQ's than white Canadians and *much higher* average IQ's than American or Jamaican blacks.² This result is an anomaly for the environmentalist programme since, as Vernon points out, socio-economic conditions are extremely poor among these Eskimos, there is a similar degree of family instability among Eskimos and Jamaicans and the Eskimos suffer from a high level of unemployment.³ Sir Peter Medawar suggests that the anomalously high scores gained by Eskimos may be due to the (alleged) fact that 'upbringing in an igloo gives *just the right degree* of cosiness, security and mutual contact to conduce to a good performance in intelligence tests'.⁴ Medawar supplies no evidence for this providential balancing of environmental factors; his hypothesis is no more than an empty verbal quibble.

In this section I have reviewed attempts to explain social class and racial differences in IQ in terms of socio-economic and cultural factors. The failure of these attempts to achieve any progress in the environmentalist programme has induced most environmentalists to stop working on social class differences in IQ. They have however continued research into racial differences in IQ, especially those between blacks and whites, and many new and complex factors have been held responsible for these differences. The most important ones are discussed in the following sections. When explaining racial differences in average IQ, the environmentalist programme is sometimes supported by researchers who are hereditarians with regard to differences in intelligence *within* populations. Such researchers justify their apparent change of allegiance by claiming that there are at least two hereditarian IQ programmes, one concerning IQ differences in the white population and the other concerning differences between the black and the white populations and the fact that the first programme is progressive lends no empirical support to the other.

The argument which has been put forward for this position is as follows: it is asserted that the fact that IQ differences are largely innate within the white population is irrelevant when considering the question of whether

¹ Crow [1969], p. 308; my italics. Crow's 'environmental variable' is clearly identical with Thoday's *ad hoc* 'environmental factor X'. Cf. *above*, section 2(d) (Part I).

² MacArthur [1968] and Berry [1966].

³ Vernon [1965], p. 723.

⁴ Medawar [1974]; my italics.

average IQ differences between the white and black populations reflect environmental or genetic differences. In particular, it is argued that even if all of the IQ variation within the white and black populations is caused by genetic variation, this does not *prove* that differences in IQ between the black and white populations are not the result of environmental differences.¹ Jensen clearly is impressed by this argument. He has replied that 'while . . . heritability within groups cannot *prove* heritability between group means, high within group heritability does increase the *a priori likelihood* that the between groups heritability is greater than zero'.² Jensen even offers a mathematical relationship connecting within-group and between-group heritability.³ Jensen's argument, which rests on the probabilist version of induction, is subject to well-known criticisms.⁴ It is trivially the case that any results which are true for one set of individuals are not *necessarily* true for another set. Thus, for example, the degree to which IQ variation is genetic in origin for one 'random' sample of Londoners is not *necessarily* the same as, or even close to, that found in another 'random' sample of the same population. The weakness of the suggestion that black-white IQ differences are entirely environmental in origin even though white-white differences reflect mainly genetic differences is that, without further elaboration, it is *ad hoc*. The suggestion is equivalent to Thoday's claim, which was discussed earlier,⁵ that blacks experience a specific IQ-determining environment which affects them all to an equal extent and which is different from the environmental factors which affect the white population. The failure of attempts to corroborate precise versions of this claim will be discussed in the following sections.

(b) *Explanations of Observed IQ Differences in Terms of Personality factors.*
(bi) *Motivation, Internal Control, Self-Esteem and Father-Absence.*

A variety of reasons have been suggested why the American Negro should have developed a radically different personality (and hence a radically different average IQ) to his white counterpart. It is said that Negro parents and their children are emotionally and socially isolated because of the emphasis within the Negro family on physical methods of control. This isolation then exposes the children to the excessive social influence of their contemporaries. These factors are said to create a personality marked by feelings of inadequacy and lacking in self-control mechanisms. American Negroes are also said to be lacking in 'achievement motivation' as a result of

¹ Cf. e.g. Lewontin [1970], Bodmer [1972], pp. 105-6 and [1973], p. 13, and Kagan [1969], p. 275.

² Jensen [1972], p. 162, footnote; my italics replace those in the original.

³ *Ibid.*, p. 30, footnote.

⁴ For an exposition, cf. Lakatos [1968a].

⁵ Cf. *above*, section 2(d) (Part I).

the matricentric structure of the Negro family and because of the use of child rearing practices which originated in slavery and which were calculated to produce a docile and obedient child.¹

Some researchers have indeed found Negroes to be less strongly motivated towards academic achievement than whites. But these results are unreproducible. Other workers find either no differences between blacks and whites in motivation, or that blacks *exceeded* whites in their desire for achievement.²

After reviewing the main theories of deprivation which have been set out to account for the low average IQ of Negroes, Irwin Katz concludes that 'psychologists have contributed little to the understanding of the motivational problems of disadvantaged students' and he adds that 'scientific knowledge has barely advanced beyond the conventional wisdom of the teacher's lounge'.³

Katz has conjectured that the two most important determinants of academic success are a sense of *internal control* and a high level of *self-evaluation*. *Internal control* refers to the 'degree to which people have a sense of efficacy, or power, and accept personal responsibility for what happens to them'⁴. This quality is held to be more pronounced among white children than among blacks and stronger in the middle class than in the working class. The extent to which individuals possess these characteristics is supposed to affect their expectation of success and hence their willingness to strive. Katz's suggestion is, however, refuted by the results of the 'Upward Bound' programme of educational intervention.⁵ These show that while the programme had produced significant increases for both Negroes and whites in measures of self-esteem and internal control, there was no significant change in their school performance. Since achievement at school is highly correlated with IQ, there was presumably no change in the children's IQ's either.

¹ For a review of these theories *cf.* Katz [1969].

² For a review of the relevant studies, *cf.* Proshansky and Newton [1968], pp. 196–202, and Shuey [1966], p. 507–8.

³ Katz, *ibid.*, p. 23. It is surprising that such diffidence about the success of the environmentalist programme should be displayed in one of the major papers in the June 1969 issue of the *Journal of Social Issues* which was explicitly dedicated to the cause of environmentalism. Katz's unassuming claims for environmentalism contrast sharply with the formal statement which opened the same volume in which the council members of the Society for the Psychological Study of Social Issues unanimously claimed that 'there is no direct evidence which supports the view that there is an innate difference between members of different groups . . . [and that] in an examination of Jensen's data, we find that observed racial differences can be attributed to environmental factors'.

⁴ Katz, *ibid.*, p. 16.

⁵ Incidentally, the results of the 'Upward Bound' programme were reported in the same issue of the *Journal of Social Issues* in which Katz's suggestions are put forward, *cf.* Hunt and Hardt [1969].

Negro children are more frequently brought up in a fatherless home than are white children and some environmentalists of a Freudian inclination hold that the resulting 'excessive' maternal influence leads to an 'imbalance in male and female roles'. This 'personality disorganisation' is said to impair intellectual performance. But whether or not absence of a father in the home causes such an unfortunate personality state or not, the largest and most extensive studies have found no relation at all between this factor and IQ.¹

(bii) The Sensory Deprivation Theory

A frequently cited theory which attempts to account for the poorer showing of American blacks in academic achievement is the sensory deprivation hypothesis. According to this theory, the Negro child is often brought up in a home where his sensory experience is severely limited and this deficiency impairs his personality. The degeneration of this particular sub-programme is traced by Baratz and Baratz in their [1970]:

The first assumption . . . is that the ghetto mother does not provide her child with adequate social and sensory stimulation (Hunt [1961]). However, further research into the ghetto environment has revealed that it is far from a vacuum; in fact there is so much sensory stimulation (at least in the eyes and ears of the middle class researcher) that a contrary thesis was necessarily (*sic*) espoused which argues that the ghetto sensory stimulation is excessive and therefore causes the child to inwardly tune it all out, thus creating a vacuum for himself (Deutsch [1963]). More recently, studies of social interaction suggest that the amount of social stimulation may be quantitatively similar for lower class and middle class children. Thus the *quantitative* deficit explanation now appears, of necessity, to be evolving into a *qualitative* explanation; that is, the child receives as much or even more stimulation as does the middle class child, but the researchers feel this stimulation is not as 'distinctive' for the lower class child as it is for the middle class child (Kagan [1968]).²

As the Baratzes point out, even if researchers had found that sensory stimulation was lacking in the homes of poor families this fact would not have corroborated the environmentalist programme since no evidence has ever been provided to support the assumption that sensory deprivation is at all related to intellectual abilities, except in extreme cases of sensory deprivation quite untypical of the ghetto situation.³

¹ For a review of all the relevant results *cf.* Proshansky and Newton [1968], pp. 202-8. Also, *cf.* Coleman, [1966], pp. 509-11, Jensen [1969], p. 85 and Katz *ibid.*, p. 20.

² Baratz and Baratz [1970], p. 37; my italics.

³ *Cf. ibid.*, p. 37. Nevertheless, this theory has been very influential amongst educationists devising so-called enrichment programmes of compensatory education. *Cf. below*, p. 250.

(biii) The Racial Stress Theory

According to another theory and one which commands a certain *prima facie* plausibility, the atmosphere of racial tension resulting from the whites' occupying a more prestigious and threatening social position leads to feelings of anxiety in Negroes and this then leads to their impaired performances on intellectual tasks. Katz and his co-workers have attempted to corroborate this theory in a series of ingenious experiments.

Negro students were tested on a digit-symbol substitution test¹ in the presence of two strangers who were either both black or both white. One of the strangers acted as a tester while the other pretended to be a fellow student working on the same task. Stress was imported into the situation by warning the students that they should expect to receive a mild or a severe electric shock during the test.²

The students' performances were found to vary in a way depending on the race of the strangers present during the test and the type of electric shock threatened. When a mild shock was threatened, the students performed better on the test in the presence of whites. When they were told they would receive a severe shock, the performance of both groups was depressed, but the threat of a severe shock was more detrimental to performance in the white than in the black condition. This result is consistent with Hull's thesis³ that mild stress (in the present case, mild shock plus white tester) improves efficiency on mental tasks, while severe stress (in this case, severe shock plus white tester) depresses efficiency.

In a subsequent investigation, Katz attempted to show that an IQ test is equivalent in stress-inducing effect for Negroes to the threat of the *severe* electric shock in the above experiment.

Some male Negro students from a southern college were tested individually—half of them by a Negro and the other half by a white examiner. When the students were told that the test was intended to measure eye-hand coordination, a non-intellectual faculty, they achieved mean scores of 28.9 and 21.4 in the presence of a white and a black examiner, respectively. Later, when the same test was described as an intelligence test, the students gained mean scores of 22.9 and 23.5 when tested by a white and a Negro, respectively.⁴

Describing the test as a test of intelligence apparently stimulated the

¹ Digit-symbol substitution tests are sometimes used as sub-tests in conventional intelligence tests.

² Katz and Greenbaum [1963].

³ Hull [1943].

⁴ Katz *et al.* [1965]. The differential performances with white and black testers only appeared when the hardest of three tests was used. Katz does not explain why the effect should depend on the difficulty of the task, except in an *ad hoc* way. Cf. Katz [1968], p. 276.

group which was being examined by a Negro but depressed the group with the white tester. Even granting that these results can be explained in terms of the mild and stimulating stress of the white examiner plus the non-IQ conditions and the severe and depressing stress of a white examiner plus the IQ conditions, it is not clear what light they shed on the differences in blacks' and whites' IQ scores. In neither of the two test conditions did the presence of the white examiner (a putative symbol of the white threat) prove to be a disadvantage for the black students.

Some researchers have claimed that Negroes perform less well on IQ tests when these are administered by a white than when administered by a black but their results are not reproducible. Shuey surveyed nineteen studies of 2,360 southern Negro children in which the examiner was also black and in which the mean IQ was 80.9. In comparable studies of 30,000 southern Negro children in which the examiner was presumed to be white,¹ the mean IQ was 80.6.

Katz has also carried out experiments which were designed to test the conjecture that the stress involved in taking the intelligence test is directly connected with the state of race relations.

In an experiment which Katz *et al.* carried out in 1964,² students at a southern black college did better on digit-symbol tests when informed that their scores would be compared with average scores gained by others (that is, other blacks) at their own college than those who were told that their performances would be compared with national averages gained by whites. A control group of white students performed equally well under both national and local-norms conditions. Low motivation cannot be the cause of a lower performance in the national-norms condition because, under this condition, the students rated themselves as caring *more* about doing well than under the local-norms condition. Katz and his co-workers suggest that being compared with white students '*aroused too much drive*' for the black students to work efficiently.³ However, this explanation has never been independently tested.

Katz advances an alternative explanation which rests on Atkinson's theory that intellectual performance depends on the individual's confidence of success.⁴ According to this theory, the greatest efficiency is achieved

¹ Shuey, *ibid.*, pp. 506-7. In many studies it was not established whether the examiner was black or white. However, if any studies made by black investigators are included in the group where the examiner was presumed to be white, this would, according to the environmentalist theory, mean that 80.6 was an excessive estimate for the average IQ of the 30,000 Negro children in this group. But if this value were revised downward, it would be *a fortiori*, a refutation of the environmentalist assumption that the Negro child is disadvantaged when tested by a white person.

² Katz, Epps, and Axelson [1964].

³ *Ibid.*, p. 83.

⁴ Atkinson [1958].

when there is a 50 per cent subjective probability of success, and both a very low and a very high expectation of success are detrimental to performance. Relying on Atkinson's theory, Katz conjectures that 'the difference between the two test conditions was due to higher subjective probability of success (closer to 0.50) when Negro subjects believed they were competing with members of their own race than when they expected to be compared with whites'.¹

This assumption has been tested and refuted. Katz was able to control the effect of expectancies of success by informing Negro subjects of the statistical probability that they would achieve a score at least average for their age group. The probabilities, which were either 10, 60 or 90 per cent, were purportedly calculated on the basis of a practice trial on a digit-symbol test, but in fact they were arbitrarily assigned. It was found that all students performed more efficiently when the expectation of success was 60 per cent, while performances were about equally poor in both the 10 and 90 per cent expectancy condition, thereby confirming Atkinson's theory. Now Katz predicted that when the subjective probability of success is held constant 'Negro subjects would perform *better* . . . when the administrator was white than when he was Negro, or when they were competing with white peers rather than with Negro peers'.² But Katz's results show that when the assigned probabilities and the race of the comparison group are kept constant, the subjects performed less well with a white administrator in 50 per cent of the cases.³ Katz also found, contrary to his prediction, that when the administrator was white, the Negro subjects gained *higher* scores when competing with other blacks than when competing with whites. Moreover, when the administrator was black, irrespective of the assigned probabilities and *even when no probabilities were assigned*, the subjects performed better when competing with whites than with blacks. This last result is the reverse of the one obtained in the experiment carried out in 1964, when the administrator was also black.⁴ This anomalous result was ascribed by Katz to regional differences, the earlier experiment (1964) having been done in Florida and the later one (1965) in Tennessee and Katz suggests that '*perhaps* the Negro student in the Deep South is more fearful of competition with white peers than is the Negro student in the Upper South'.⁵

The results of a further experiment carried out in 1971 also conflicted with those of the experiment of 1964 when it was found that male black students from one northern and one southern college performed

¹ Katz [1968], p. 278.

³ *Ibid.*, pp. 279-81.

⁵ *Ibid.*, p. 281; my italics.

² Katz, *ibid.*, p. 278.

⁴ Cf. *above*, p. 247.

better in the presence of a black examiner when informed that the comparison group was white (white-norms condition) rather than black (black-norms condition).¹

The conflict between the results of the 1964 and 1971 experiments was explained by assuming that the Negroes regarded white standards as not only a more attractive goal, but also as a more difficult one to achieve. Katz *et al.* suggest that, in the 1964 experiment, 'the depressant motivational effect of having a low expectancy of success (in the white-norm condition) could have outweighed the facilitating influence of the incentive value of success'². In the 1971 experiment, the subjects were of a higher academic standard and it is claimed that they were more confident in their ability to compete intellectually against their white contemporaries.³

Even though Katz *et al.* specifically claim that the results of their 1971 experiment were 'as predicted', there is no evidence that this was in fact a prediction. Since Katz has never assigned relative weights to the factors of 'expectancy of success', 'incentive value of success' and academic self-confidence, it is difficult to see how he could have predicted the effect of changing the academic ability of the Negroes he investigated. Moreover, Katz's claim that he predicted the result of his [1971] experiment conflicts with the statement (at the end of the paper in which this result is reported) that '*at present one cannot predict with assurance the specific types of Negro students who may benefit from cross-racial competition or the specific types of tasks and achievement settings that will reveal behavioural facilitation*'.⁴

Furthermore, the original thesis that their subordinate social position is detrimental to Negroes' academic performances now seems to be considerably weakened. For some Negroes at least, social threat and racial stress appear to be of distinct advantage!

Katz's research programme has degenerated. It explained the observed differential intellectual levels of black and white subjects in a *post hoc* way by interpreting them as a result of arbitrary combinations of several plausible factors.⁵ (a) Feelings of inferiority in the Negro producing a low expectancy of success, (b) 'social threat' leading to detrimental emotional reactions and (c) 'failure threat' arising from the disapproval of academic failure by 'significant others' may all contribute to a low Negro performance. On the other hand, if these feelings are only mild, then they may produce a *beneficial* response and provide a stimulus for improved performance. An improved performance may also result from the higher motivation associated with the fact that academic success in competition

¹ Epps, Katz, Perry and Runyon [1971].

² *Ibid.*, p. 201.

³ *Ibid.*, p. 201.

⁴ *Ibid.*, p. 207; my italics. Katz also admits that his theory has no predictive power in his [1968]. Cf. *below*, p. 250, footnote 1.

⁵ The importance of each of these factors is discussed in Katz [1969].

with whites is of 'higher incentive value'. Katz's catch-all matrix of factors has the superficial attraction that it can account for the inferior or superior performance of Negroes under all circumstances. But it also has the disadvantage that it lacks predictive power.¹

(c) *Tests of Environmentalist Theories in Compensatory Education Schemes*

According to the hereditarian programme, differences in intelligence are innate and cannot be altered by social engineering, except when the latter interferes with the action of the genes. On the other hand, the environmentalist programme asserts that those with low IQ's are deprived of one or more material, cultural or psychological factors enjoyed by people with high IQ's. One way in which the environmentalist theories are tested is by trying to increase the IQ scores gained by individuals by supplying them with the putative missing environmental factor or factors. Such tests have been made on a large scale, especially in America, in 'compensatory education' schemes.²

Compensatory education schemes are usually devised to test one or more of three theories of deprivation; these are that the low IQ child has insufficient self-esteem,³ that he suffers from a lack of stimulation at home,⁴ and that the low quality of his language inhibits learning.⁵

¹ This is admitted by Katz ([1968], p. 271) who says that 'there does not exist at present any comprehensive system of variables for predicting the specific effects of different conditions of stress on the Negro child's performance of various academic tasks'. The *post-hoc* nature of Katz's explanations is particularly clearly illustrated in his juggling with factors when attempting to explain the influence of shock threat on Negroes' intellectual performances:

'There are a number of ways of looking at the effects of shock threat. First, if Negro subjects cared more about performing well in the white condition they would have been more fearful lest the strong shock would thus become more salient and distracting. An upward spiral of debilitation could then be set in motion as distraction and fear made the task seem more difficult and this in turn aroused further emotion. Subjects in the Negro environment, on the other hand, had a relatively relaxed attitude toward the task in the low-threat condition (*too* relaxed for good performance). Hence they would not have been fearful of possible decrements due to shock, but *perhaps just enough* concerned to work harder than before. Also relevant to these data is Bovard's . . . notion that the ability to withstand stress is strengthened by the presence of familiar social stimuli that have nurturant associations (in this case other Negroes). (Katz *ibid.*, p. 275; my italics.)

² The main task of these schemes was not specifically to raise the IQ scores of the children but to stimulate their general academic performance. That school performance may be changed by environmental manipulation is not ruled out by either the hereditarian or the environmentalist programme.

³ Cf. *above*, pp. 243-4.

⁴ Cf. *above*, p. 245.

⁵ The theory that lower class children speak in a 'restricted code' while middle class children acquire an 'elaborated code' of speech and that the intellectual development of lower class children is consequently hampered was proposed by Basil Bernstein. (Cf. especially his [1961].) This theory is not supported by any evidence; the large amount of disconfirming evidence is reviewed by Ginsburg in his [1972] (pp. 58-93). Bernstein has now apparently abandoned the theory. (Cf. Bernstein [1970])

In the widely publicised 'Headstart' programme in America, a concentrated effort was made in selected deprived areas to provide vastly improved educational facilities as well as to replace inadequate medical and other social facilities. Despite such intensive efforts, Headstart and other programmes have been judged, *from the academic point of view*, to have been a complete failure. IQ's were not raised and school performance was only slightly affected.

In a few small and very intensive programmes, significant increases in some children's IQ's have been claimed. Occasionally these increases are very large.¹ Where unexpected gains in IQ are produced they are accounted for by hereditarians by suggesting that the IQ tests were not culture fair. In particular, Jensen conjectures that the tests were not culture fair when they were first administered because, on this occasion, the children would have found the testing situation unfamiliar and emotionally disturbing.² He also conjectures that the compensatory education provided the equivalent of direct coaching for the IQ tests.³ (It is well-known that coaching for IQ tests produces gains of up to ten points.⁴) These hypotheses are independently testable by repeating the successful compensatory education schemes using culture fair tests and taking precautions to set the children at ease during the test. In fact no compensatory education scheme has yet been reported which raises IQ scores on culture fair tests of intelligence.⁵

The failure of most compensatory education schemes to elicit higher IQ scores has been explained in a variety of ways by environmentalists. According to some, the deficiencies which Negroes suffer, especially in terms of their linguistic and conceptual systems, are too well established by the time the intervention programmes start.⁶ Environmentalists have consequently suggested that compensatory education should start when the child is much younger and some have even advocated completely removing children from their homes to be brought up in specialised institutions.⁷

Martin Richards, commenting on the failure of Headstart and other schemes, remarks that 'it is hard to believe that we [the psychologists involved] all could have been so simple minded' and he claims that psychologists have now 'cultivated a feeling for the *complexities of the organisation and structure of the behaviour of children and the subtleties of their transactions with the environment*'.⁸ When a theory is controverted by an observation,

¹ For a review of these programmes, cf. Jensen [1969], pp. 104-7.

² Jensen [1969], p. 100.

³ *Ibid.*, pp. 100-1.

⁴ Cf. Jensen, *ibid.*, p. 101.

⁵ Cf. e.g. Caldwell [1967].

⁶ Vernon [1954].

⁷ Cf. e.g. Caldwell [1968].

⁸ Richards [1973]; my italics.

the canons of intellectual honesty demand that the scientist should acknowledge the anomaly and that he should try to account for it in a non-*ad hoc* way. Richards, by not specifying the nature of the subtleties and complexities which he alleges are important, merely plays down the significance of a hard counter-example by a woolly monster-barring stratagem.

An interesting conspiracy theory has been suggested to account for the failure of compensatory education. According to this theory, the improved conditions and education which a successful programme would have brought about would have led to the Negroes' gaining a more acute awareness of their social and political position and that this was too great a threat to the power of the established white middle-class. Therefore 'Headstart *had to be* unsuccessful because success would have led to fundamental social and political changes that the non-poor were not prepared to accept'.¹ Such untestable hypotheses have no place within science.

(d) *The Inheritance of the Environment*

Environmentalists, in bending over backwards to preserve their theory intact, have sometimes inadvertently, toppled over into the hereditarian camp. The biologist Steven Rose, for instance, claims that 'nutritional-deficiency in childhood results in permanent changes in brain chemistry for which a subsequent adequate diet does not compensate'.² Indeed, there is some evidence relating early nutritional deficiencies in children to their later IQ scores and subsequent researches along these lines may well make significant contributions to the environmentalist programme. But Rose goes further and claims that 'such effects are transmitted between one generation and the next', and furthermore that 'brain structure and chemistry [which] determine performance are subtly but profoundly affected by *immediate* environmental factors and by those stretching back beyond our own generation *into an indeterminate distance into the past*'.³ But if the time when the important environmental factors step in is '*indeterminate*', then Professor Rose's theory cannot be tested and it is scientifically valueless.⁴

It is held further that not only environmentally induced chemical factors may be inherited but that there are some 'cultural patterns that are so resistant to alteration that they have the *appearance* of being innate; indeed, the difficulties in changing the attitudes to school performance and

¹ Richards, Richardson and Spears [1972], p. 184; my italics.

² Rose [1972], p. 143.

³ *Ibid.*, p. 143; my italics.

⁴ It is interesting that there is considerable similarity between Rose's theory and the hereditarian theory proposed by Galton; both assert that intelligence is inherited, in a non-Mendelian manner.

in changing IQ in deprived populations reflect, in part, the difficulty in changing a cultural pattern.¹ John Rex considers that 'the *crucial* variable is the difference between white and Negro history and the fact that Negro history involves the fact of slavery'². Consequently any experiment designed to compensate for the differences in environment between black and white 'would mean subjecting the group of Negroes to white experience over several hundred years, or subjecting a group of whites to Negro experience'³. Rex admits that no experiment can be designed to test his assumption but he regards this as 'fortunate'⁴ for the hereditarian programme. But Popper surely taught us that while such facts may be seen as 'fortunate' by a pseudo-scientist, they must be regarded as *unfortunate* by the scientist.

(e) *Conclusion*

In this Part of my paper I have considered some of the predictions made by the environmentalist programme, especially in regard to social class and racial differences in average IQ. I have shown that almost none of these predictions has been confirmed and that when predictions have failed, environmentalists have rescued their theories in an *ad hoc* fashion. This patching-up process has left the environmentalist programme as little more than a collection of untestable theories which provide a '*passé partout* which explains everything because it explains nothing'⁵. For example, Bodmer has concluded that the differences in average IQ between American blacks and whites 'could be explained by environmental factors, many of which we still know nothing about'⁶. Professor Bodmer is of course right: everything in the world can be explained by factors about which we know nothing.

The fact that the environmentalist programme has been degenerating does not mean that no progressive programme will ever be based on its hard core. Of the infinite number of possible IQ-determining environmental factors only a handful has been investigated. Resourceful environmentalists of the future may well invent a powerful heuristic which will

¹ Bodmer [1972], p. 87; my italics.

² Rex [1972], p. 170; my italics.

³ Rex, *ibid.*, p. 170.

⁴ *Ibid.*, p. 87.

⁵ This perceptive phrase was attributed by Isaiah Berlin ([1939], p. 118) to Marx. It appears, however, that the credit should go to Berlin himself, since he apparently interpolates the phrase into a translation of Marx's celebrated letter to Mikhailovskii (Marx [1877]). Imre Lakatos called my attention to the fact that Berlin's deep *aperçu* was later repeated (unfortunately without acknowledgment) by two other great thinkers of this century in almost the very same year. In Agatha Christie's words: 'Dr. Maverick [a psychologist] can explain *anything* [therefore it is not worth listening]'. (Christie [1952], p. 144.) Karl Popper, a year later, put it still better, when he referred to 'those impressive and all-explanatory theories which act upon weak minds like revelations'. (Popper [1963], p. 39.)

⁶ Bodmer [1972], p. 112.

lead them to *content-increasing* explanations of individual and group differences in IQ's.¹

REFERENCES

- ALTUS, G. T. [1956]: 'Some correlates of the Davis-Eells tests', *Journal of Consulting Psychology*, 20, pp. 227-32.
- ANASTASI, A. [1958]: *Differential Psychology*, Third edition.
- ATKINSON, J. W. [1958]: 'Towards experimental analysis of human motives in terms of motives, expectancies, and incentives', in J. W. Atkinson (ed.): *Motives in fantasy, action, and society*, pp. 288-305.
- BAJEMA, C. J. [1963]: 'Estimation of the direction and intensity of natural selection in relation to human intelligence by means of the intrinsic rate of natural increase', *Eugenics Quarterly*, 10, pp. 175-87. Reprinted in H. J. Butcher and D. E. Lomax (eds.): *Readings in Human Intelligence*, pp. 249-264.
- BARATZ, S. S. and BARATZ, J. C. [1970]: 'Early childhood intervention: the social science base of institutional racism', *Harvard Educational Review*, 40, pp. 29-50.
- BENDIX, R. and LIPSET, S. M. [1960]: *Social Mobility in Industrial Society*.
- BERLIN, I. [1939]: *Karl Marx*.
- BERNSTEIN, B. [1961]: 'Social class and linguistic development: a theory of social learning', in A. H. Halsey, J. Floud and C. A. Anderson (eds.): *Education, Economy, and Society*, pp. 288-314.
- BERNSTEIN, B. [1970]: 'Education cannot compensate for society', *New Society*, No. 387, pp. 344-7.
- BERRY, J. W. [1967]: 'Temne and Eskimo perceptual skills', *International Journal of Psychology*, 1, pp. 207-22.
- BINET, A. [1911]: 'Nouvelles recherches sur la mesure du niveau intellectuel chez les enfants d'école', *L'Année Psychologique*, 17, pp. 145-201.
- BINET, A. and HENRI, V. [1895]: 'La psychologie individuelle', *L'Année Psychologique*, 2, pp. 411-65.
- BINET, A. and SIMON, T. [1905a]: 'Methodes nouvelles pour le diagnostic du niveau intellectuel des anormaux', *L'Année Psychologique*, 11, pp. 191-244.
- BINET, A. and SIMON, T. [1905b]: 'Applications des methodes nouvelles au diagnostic du niveau intellectuel chez des enfants normaux et anormaux d'hospice et d'école primaire', *L'Année Psychologique*, 11, pp. 245-336.
- BODMER, W. F. [1972]: 'Race and IQ: the genetic background', in K. Richardson, D. Spears and M. Richards (eds.): *Race, Culture and Intelligence*, pp. 83-113.
- BODMER, W. F. [1973]: 'Jensenism', *The Listener*, 89, 4 January, pp. 12-16.
- BRUSH, S. G. [1965]: *Kinetic Theory*, 1.
- BURKS, B. S. [1928]: 'The relative influence of nature and nurture upon mental development: a comparative study of foster parent-foster child resemblance and true parent-true child resemblance', *27th Yearbook of the National Society for the Study of Education*, 27, pp. 219-316.
- BURT, C. [1917]: *The Distribution and Relations of Educational Abilities* (London County Council Reports, no. 1868).
- BURT, C. [1935]: *The Subnormal Mind*.
- BURT, C. [1943]: 'Ability and income', *The British Journal of Educational Psychology*, 13, pp. 83-98.

¹ Neither Bodmer nor Cavalli-Sforza is likely to be among this group of tenacious environmentalists. These two scientists wish to discourage research into the field of racial differences in intelligence because, at present, there are obstacles to *proving* whether these differences are genetically determined and because such studies might be 'misinterpreted as a form of racism' (in their otherwise excellent [1971], p. 800). (Professors Bodmer and Cavalli-Sforza might like to be reminded of the days when Relativity theory was 'misinterpreted' as a form of Semitism.)

The question whether the search for truth should be abandoned out of deference to political sensitivities is not discussed in this paper.

- BURT, C. [1955]: 'The evidence for the concept of intelligence', *The British Journal of Educational Psychology*, 25, pp. 158-77.
- BURT, C. [1957]: 'The distribution of intelligence', *The British Journal of Psychology*, 48, pp. 161-75.
- BURT, C. [1959]: 'Class differences in general intelligence: III', *The British Journal of Statistical Psychology*, 12, pp. 15-33.
- BURT, C. [1961a]: 'Intelligence and social mobility', *The British Journal of Statistical Psychology*, 10, pp. 33-63.
- BURT, C. [1961b]: 'The gifted child', *The British Journal of Statistical Psychology*, 14, pp. 123-39.
- BURT, C. [1963]: 'Is intelligence distributed normally?', *The British Journal of Statistical Psychology*, 16, pp. 175-90.
- BURT, C. [1966]: 'The genetic determination of differences in intelligence: a study of monozygotic twins reared together and apart', *The British Journal of Psychology*, 57, pp. 137-53.
- BURT, C. [1971]: 'Quantitative genetics in psychology', *The British Journal of Mathematical and Statistical Psychology*, 24, pp. 1-21.
- BURT, C. and HOWARD, M. [1956]: 'The multifactorial theory of inheritance and its application to intelligence', *The British Journal of Statistical Psychology*, 9, pp. 95-131.
- BURT, C. and HOWARD, M. [1957]: 'Heredity and intelligence: a reply to criticisms', *The British Journal of Statistical Psychology*, 10, pp. 33-63.
- CALDWELL, B. [1967]: 'What is the optimal learning environment for the young child?', *American Journal of Orthopsychiatry*, 37, pp. 9-21.
- CALDWELL, B. [1968]: 'The fourth dimension in early childhood education' in R. Hess and R. Bear (eds.): *Early Education: Current Theory, Research and Action*.
- CARTER, C. O. [1966]: 'Differential fertility by intelligence', in J. E. Meade and A. S. Parkes (eds.): *Genetic and Environmental Factors in Human Ability*, pp. 185-200.
- CATTELL, J. McK. [1890]: 'Mental tests and measurements', *Mind*, 15, pp. 373-81.
- CATTELL, R. B. [1937]: *The Fight for our National Intelligence*.
- CATTELL, R. B. [1950]: 'The fate of national intelligence: test of a thirteen-year prediction', *The Eugenics Review*, 42, pp. 136-48.
- CAVALLI-SFORZA, L. L. and BODMER, W. F. [1971]: *The Genetics of Human Populations*.
- CHRISTIE, A. [1952]: *They do it with mirrors*.
- COLEMAN, J. S. et al. [1966]: *Equality of Educational Opportunity*.
- CONWAY, J. [1958]: 'The inheritance of intelligence and its social implications', *The British Journal of Statistical Psychology*, 11, pp. 171-90.
- CONWAY, J. [1959]: 'Class differences in general intelligence II', *The British Journal of Statistical Psychology*, 12, pp. 5-14.
- CROW, J. F. [1969]: 'Genetic theories and influences: Comments on the value of diversity', *Harvard Educational Review*, 39, pp. 301-9.
- DANIELS, J. and HOUGHTON, V. [1972]: 'Jensen, Eysenck and the eclipse of the Galton Paradigm', in K. Richardson, D. Spears and M. Richards (eds.): *Race, Culture and Intelligence*, pp. 68-80.
- DAVIS, A. [1949]: *Social Class Influences upon Learning*.
- DESCARTES, R. [1637]: *Discourse on Method*, in E. S. Haldane and G. R. T. Ross (eds.) *The Philosophical Works of Descartes*.
- DEUTSCH, C. P. [1963]: 'Auditory discrimination and learning: social factors', *Merrill-Palmer Quarterly of Behavior and Development*, 10, (3), pp. 277-96, reprinted in M. Deutsch (ed.): *The Disadvantaged Child*, 1967.
- DEUTSCH, M. [1969]: 'Happenings on the way back to the forum: social science, IQ, and race differences revisited', *Harvard Educational Review*, 39, pp. 523-54.
- EELLS, K., DAVIS, A., HAVIGHURST, R. J., HERRICK, V. E. and TYLER, R. [1951]: *Intelligence and Cultural Differences*.
- EPFS, E. G., KATZ, I., PERRY, A. and RUNYON, E. [1971]: 'Effect of race of comparison referent and motives on Negro cognitive performance', *Journal of Educational Psychology*, 62, pp. 201-8.
- EYSENCK, H. J. [1939]: 'Review of L. L. Thurstone's 'Primary mental abilities'', *The British Journal of Educational Psychology*, 9, pp. 270-5.
- EYSENCK, H. J. [1971a]: *Race, Intelligence and Education*.

- EYSENCK, H. J. [1971b]: Letter in *New Society*, 8 July.
- EYSENCK, J. J. [1973]: *The Inequality of Man*.
- FALCONER, D. S. [1960]: *Introduction to Quantitative Genetics*.
- FREEMAN, F. N. [1939]: *Mental Tests*.
- FREEMAN, F. S. [1963]: *Theory and Practice of Psychological Testing*.
- FISHER, R. A. [1918]: 'The correlation between relatives on the supposition of Mendelian inheritance', *Transactions of the Royal Society of Edinburgh*, 52, pp. 399-433.
- GALTON, F. [1865]: 'Hereditary talent and character', *Macmillan's Magazine*, 12, pp. 157-66, 318-27.
- GALTON, F. [1869]: *Hereditary Genius: an enquiry into its laws and consequences*.
- GALTON, F. [1883]: *Inquiries into Human Faculty and its Development*.
- GALTON, F. [1889]: *Natural Inheritance*.
- GAW, F. [1925]: 'A study of performance tests', *The British Journal of Psychology*, 15, pp. 374-92.
- GINSBURG, H. [1972]: *The Myth of the Deprived Child*.
- GITTELL, M. [1971]: *New York City School Fact Book*.
- GLASS, D. V. [1954]: *Social Mobility in Britain*.
- GORDON, H. [1923]: *Mental and Scholastic Tests among Retarded Children*, Board of Education, Education Pamphlet No. 44.
- HALSEY, A. H. [1958]: 'Genetics, social class, and intelligence', *British Journal of Sociology*, 9, pp. 15-28.
- HALSEY, A. H. [1959]: 'Class differences in general intelligence: I', *The British Journal of Statistical Psychology*, 12, pp. 1-4.
- HERRNSTEIN, R. J. [1971]: 'I.Q.', *The Atlantic Monthly*, pp. 43-64.
- HERRNSTEIN, R. J. [1973]: *IQ in the Meritocracy*.
- HIGGINS, J., REED, E. and REED, S. [1962]: 'Intelligence and family size: a paradox resolved', *Eugenics Quarterly*, 9, pp. 84-90.
- HONZIG, M. P. [1957]: 'Developmental studies of parent-child resemblance in intelligence', *Child Development*, 28, pp. 125-8.
- HUDSEN, L. [1971]: 'Science and Popularisation', *New Society*, pp. 29-30.
- HULL, C. L. [1943]: *Principles of Behavior*.
- HUNT, J. McV.: [1961]: *Intelligence and Experience*.
- HUNT, D. E. and HARDT, R. H. [1969]: 'The effect of Upward Bound programmes on the attitudes, motivation and academic achievement of Negro students', *Journal of Social Issues*, 25, pp. 117-29.
- HUNTLEY, R. M. C. [1966]: 'Heritability of Intelligence', in J. E. Meade and A. S. Parkes (eds.): *Genetic and Environmental Factors in Human Ability*, pp. 201-18.
- JENCKS, C. [1972]: *Inequality*.
- JENSEN, A. R. [1969]: 'How much can we boost IQ and scholastic achievement?', *Harvard Educational Review*, 39, pp. 1-123.
- JENSEN, A. R. [1970a]: 'A theory of primary and secondary familial mental retardation' in N. R. Ellis (ed.) *International Review of Research in Mental Retardation*, 4, pp. 33-105.
- JENSEN, A. R. [1970b]: 'IQ's of identical twins reared apart', *Behaviour Genetics*, 1, pp. 133-48.
- JENSEN, A. R. [1971]: 'Do schools cheat minority children?', *Educational Research*, 14, pp. 3-28.
- JENSEN, A. R. [1972]: *Genetics and Education*.
- JENSEN, A. R. [1973a]: *Educability and Group Differences*.
- JENSEN, A. R. [1973b]: *Educational Differences*.
- JINKS, J. L. and FULKER, D. W. [1970]: 'Comparison of the biometrical genetical, MAVA, and classical approaches to the analysis of human behaviour', *Psychological Bulletin*, 73, pp. 311-49.
- KAGAN, J. C. [1968]: 'His struggle for identity', *Saturday Review*, December, 1968.
- KAGAN, J. S. [1969]: 'Inadequate evidence and illogical conclusions', *Harvard Education Review*, 39, pp. 274-7.
- KATZ, I., [1968]: 'Factors influencing Negro performance in the desegregated school', in M. Deutsch, I. Katz and A. R. Jensen (eds.): *Social Class, Race and Psychological Development*, pp. 254-89.

- KATZ, I. [1969]: 'A critique of personality approaches to Negro performance, with research suggestions', *Journal of Social Issues*, 25, pp. 13-27.
- KATZ, I. and GREENBAUM, C. [1963]: 'Effects of anxiety, threat and racial environment on task performance of Negro college students', *Journal of Abnormal Social Psychology*, 66, pp. 562-7.
- KATZ, I., EPPS, E. G. and AXELSON, L. J. [1964]: 'Effect upon Negro digit-symbol performance of anticipated comparison with whites and with other Negroes', *Journal of Abnormal and Social Psychology*, 69, pp. 77-83.
- KATZ, I., ROBERTS, S. O. and ROBINSON, J. M. [1965]: 'Effects of difficulty, race of administrator, and instructions on Negro digit-symbol performance', *Journal of Personality and Social Psychology*, 70, pp. 53-9.
- KELLEY, T. L. [1928]: *Crossroads in the mind of man: A study of differentiable mental abilities*.
- LAKATOS, I. [1963-1964]: 'Proofs and refutations', *The British Journal for the Philosophy of Science*, 14, pp. 1-25, 120-39, 221-43, 296-342.
- LAKATOS, I. [1968a]: 'Changes in the Problem of Inductive Logic', in I. Lakatos (ed.): *The Problem of Inductive Logic*, pp. 315-417.
- LAKATOS, I. [1968b]: 'Criticism and the Methodology of Scientific Research Programmes', *Proceedings of the Aristotelian Society*, 69, pp. 149-86.
- LAKATOS, I. [1970]: 'Falsification and the Methodology of Scientific Research Programmes' in I. Lakatos and A. Musgrave (eds.): *Criticism and the Growth of Knowledge*, pp. 91-195.
- LAKATOS, I. [1971a]: 'History of Science and its Rational Reconstructions' in R. C. Buck and R. S. Cohen (eds.): *Boston Studies in the Philosophy of Science*, 8, pp. 91-136.
- LAKATOS, I. [1971b]: 'Popper zum Abgrenzungs- und Induktionsproblem' in H. Lenk (ed.): *Neue Aspekte der Wissenschaftstheorie*, pp. 75-110; translated into English as 'Popper on Demarcation and Induction' in P. A. Schilpp (ed.): *The Philosophy of Sir Karl Popper*, 1974.
- LAKATOS, I. and ZAHAR, E. G. [1975]: 'Why did Copernicus's Programme supersede Ptolemy's?', in R. S. Westman (ed.): *The Copernican Achievement*.
- LEROY [1899]: 'Science et Philosophie', *Revue de Métaphysique et de Morale*, 9, pp. 503-62, 706-31.
- LEWIS, D. G. [1957]: 'The normal distribution of intelligence: a critique', *The British Journal of Psychology*, 48, pp. 98-104.
- LEWONTIN, R. C. [1970]: 'Race and Intelligence', *Bulletin of the Atomic Scientists*, 26, pp. 2-8.
- LIPSET, S. M. and ZETTERBERG, H. L. [1956]: 'A theory of social mobility', *Transactions of the Third World Congress of Sociology*, 3, pp. 155-77.
- MACARTHUR, R. S. and ELLEY, W. B. [1963]: 'The reduction of socio-economic bias in intelligence testing', *The British Journal of Educational Psychology*, 33, pp. 107-19.
- MACARTHUR, R. S. [1968]: 'Some differential abilities of northern Canadian native youth', *International Journal of Psychology*, 3, pp. 43-51.
- MCGURK, F. C. J. [1967]: 'The culture hypothesis and psychological tests', in R. E. Kuttner (ed.): *Race and Modern Science*.
- MCMENAR, Q. [1940]: 'A critical examination of the University of Iowa studies of environmental influences upon the IQ', *Psychological Bulletin*, 37, pp. 63-92.
- MCMENAR, Q. [1942]: *The Revision of the Stanford-Binet Scale*.
- MADDOX, H. [1957]: 'Nature-nurture balance sheets', *The British Journal of Educational Psychology*, 27, pp. 166-75.
- MARX, K. [1877]: 'Letter to Mikhailovski' in K. Marx and F. Engels [1953].
- MARX, K. and ENGELS, F. [1953]: *Ausgewählte Briefe*, Berlin Dietz.
- MEDAWAR, P. E. [1974]: 'More unequal than others', *New Statesman*, 11 January.
- MILHAUD [1896]: 'La Science Rationelle', *Revue de Métaphysique et de Morale*, 4, pp. 280-302.
- MORANT, G. M. [1956]: 'The significance of racial differences', in *The Race Question in Modern Science*, pp. 285-321, UNESCO.
- MILLER, S. M. [1960]: 'Comparative social mobility', *Current Sociology*, 9, pp. 1-89.
- NEWMAN, H. H., FREEMAN, F. N. and HOLZINGER, K. J. [1937]: *Twins: A study of heredity and environment*.

- PEARSON, K. [1904]: 'On the laws of inheritance of man II', *Biometrika*, 3, pp. 131-90.
- PENROSE, L. [1963]: *The Biology of Mental Defect*, 3rd edition.
- POPPER, K. [1934]: *Logik der Forschung*, 1935 (Expanded English edition: Popper [1959]).
- POPPER, K. [1959]: *The Logic of Scientific Discovery*.
- POPPER, K. [1963]: *Conjectures and Refutations*.
- POPPER, K. [1972]: *Objective Knowledge*.
- PROSHANSKY, H., and NEWTON, P. [1968]: 'The nature and meaning of Negro self-identity', in M. Deutsch, I. Katz and A. R. Jensen (eds.): *Social Class, Race, and Psychological Development*, pp. 178-218.
- REX, J. [1971]: Letter in *New Society*, No. 456.
- REX, J. [1972]: 'Nature versus nurture: the significance of the revived debate', in M. Richards, K. Richardson and D. Spears (eds.): *Race, Culture and Intelligence*, pp. 167-78.
- RICHARDS, M. [1973]: 'Putting Jensenism in its proper place', *The Times Higher Education Supplement*, 20th July, p. 11.
- RICHARDS, M., RICHARDSON, K. and SPEARS, D. [1972]: 'Conclusions: intelligence and society', in M. Richards, K. Richardson and D. Spears (eds.): *Race, Culture and Intelligence*, pp. 179-96.
- RICHARDSON, K. and HOUGHTON, D. [1973]: 'Race and IQ—a reply', *New Humanist*, 89, pp. 159-60.
- RICHMOND, W. K. [1953]: 'Educational measurement: its scope and limitations: a critique', *The British Journal of Psychology*, 44, pp. 221-31.
- ROBERTS, J. A. F. [1952]: 'The genetics of mental deficiency', *Eugenics Review*, 44, pp. 71-83.
- ROSE, S. [1972]: 'Environmental effects on brain and behaviour', in M. Richards, K. Richardson and D. Spears (eds.): *Race, Culture and Intelligence*, pp. 128-144.
- RYAN, J. [1972]: 'I.Q.—the illusion of objectivity', in K. Richardson, D. Spears and M. Richards (eds.): *Race, Culture and Intelligence*, pp. 36-55.
- SHUEY, A. M. [1966]: *The Testing of Negro Intelligence*, Second edition.
- SIMON, B. [1971]: *Intelligence, Psychology and Education, a Marxist Critique*.
- SKODAK, M. and SKEELS, H. M. [1949]: 'A final follow-up study of one hundred adopted children', *Journal of Genetic Psychology*, 75, pp. 85-125.
- SPEARMAN, C. [1904]: 'General intelligence objectively determined and measured', *American Journal of Psychology*, 115, pp. 210-92.
- SPEARMAN, C. [1927]: *The Abilities of Man*.
- SPEARMAN, C. [1939]: 'Thurstone's work reworked', *The Journal of Educational Psychology*, 30, pp. 1-16.
- SWIFT, D. [1972]: 'What is the Environment?', in K. Richardson, D. Spears and M. Richards (eds.): *Race, Culture and Intelligence*, pp. 147-66.
- TERMAN, L. M. [1916]: *The Measurement of Intelligence*.
- TERMAN, L. M. and MERRILL, M. A. [1937]: *Measuring Intelligence*.
- TERMAN, L. M. and MERRILL, M. A. [1960]: *Stanford-Binet Intelligence Scale*.
- THODAY, J. M. [1973]: 'Educability and Group Differences', *Nature*, 245, pp. 418-20.
- THOMPSON, G. H. et al. [1949]: *The Trend of Scottish Intelligence*.
- THORNDIKE, E. L. [1914]: *Educational Psychology*.
- THORNDIKE, E. L. [1925]: *The Measurement of Intelligence*.
- THURSTONE, L. L. [1938]: *Primary Mental Abilities*, Monographs of the Psychometric Society, 1.
- THURSTONE, L. L. [1948]: 'Psychological implications of factor analysis', *American Psychologist*, 3, pp. 402-8.
- THURSTONE, L. L. and THURSTONE, T. G. [1941]: *Factorial Studies of Intelligence*.
- U.N.E.S.C.O. [1950]: 'Statement on Race', in *What is Race?*, U.N.E.S.C.O., 1952, pp. 76-80.
- VERNON, P. E. [1950]: *The Structure of Human Abilities*.
- VERNON, P. E. [1951]: 'Recent investigations of intelligence and its measurement', *Eugenics Review*, 43, pp. 125-37.
- VERNON, P. E. [1954]: 'Symposium on the effects of coaching and practice in intelligence tests', *The British Journal of Educational Psychology*, 35, pp. 5-8.

- VERNON, P. E. [1965]: 'Ability factors and environmental influences', *American Psychologist*, 20, pp. 723-33.
- WARBURTON, F. W. [1969]: 'The British Intelligence Scale', in B. Dockrell (ed.): *On Intelligence*, pp. 71-98.
- WATKINS, J. W. N. [1958]: 'Confirmable and influential metaphysics', *Mind*, 67, pp. 344-65.
- WATSON, J. B. [1931]: *Behaviorism*.
- WECHSLER, D. [1944]: *The Measurement of Adult Intelligence*.
- WISSLER, C. [1901]: 'The correlation of mental and physical tests', *Psychological Review Monograph*, 3, pp. 1-63.
- WOLF, T. H. [1969]: 'The Emergence of Binet's Conceptions and Measurement of Intelligence: A Case History of the Creative Process', *Journal of the History of the Behavioural Sciences*, 5, pp. 113-34, 207-37.
- YERKES, R. M. [1921]: *Psychological Examining in the United States Army*.
- ZAHAR, E. [1973]: 'Why did Einstein's programme supersede Lorentz's?', *The British Journal for the Philosophy of Science*, 24, pp. 95-123, 223-62.