

Words

Nature and nurture

David Papineau *Department of History and Philosophy of Science, Cambridge University*

Do genes influence intellectual abilities? A lot of people find this question somehow objectionable. Insofar as they are prepared to address it at all, they are likely to be extremely suspicious of any arguments for the hereditarian position. They feel there is something improper, something almost tasteless, about the idea that intellectual abilities derive from genes. (Many such people took their suspicions to be triumphantly vindicated by the much-publicised exposure a couple of years ago of Sir Cyril Burt's ingenious research practices.)

I shall argue that this familiar resistance to hereditarian claims is misguided, on two counts. Firstly, it is misguided on the factual issue of whether all mental abilities can indeed be explained by environmental factors. And secondly, and much more importantly (since this of course is what the fuss is all about) it is politically misguided in thinking that any concessions to hereditarianism will immediately open the way to all kinds of inequality and oppression.

I

Let us take the factual side first, if only to get clear what we are talking about. Here the case of Burt has done much to obscure the issue. Burt did undoubtedly cheat, in imaginative and thorough ways, and his data are therefore quite worthless. But there have been a good number of similar surveys since, with somewhat better claims to reputability, and together they really do leave little doubt that, for IQ scores at least, a purely environmentalist view is mistaken.

There are certainly criticisms to be made of some of these surveys, and much to object to in many of the further inferences drawn from them (especially about racial differences, of which more later), but a grasp of the actual data has persuaded even critics with strong initial resistance of some heritable influence. As Ned Block and Gerald Dworkin admit, in an editorial contribution to *The IQ Controversy* which leaves no doubt

about their liberal credentials: 'There are now so many lines of evidence for substantial heritability . . . that, in spite of substantial bias in most of them, it is unlikely that all are misleading' (1).

What many converted sceptics do insist on, though, is care with the precise meaning of 'heritability'. Actual numerical estimates for the heritability of IQ scores in Great Britain and the USA range between 20 per cent and 80 per cent. What do such numbers mean?

One might naturally enough suppose that they indicate the average contribution that genes make to IQ scores (as for instance one might say that 15 per cent of personal income in the UK consists of unearned income). The trouble is that it is not at all clear how such an average contribution figure might be estimated. Even if we rather simple-mindedly postulate that IQ scores are linearly determined by some kind of 'gene scores' and 'environment scores' ($IQ = aG + bE$), and so can make notional sense of average contribution figures, there is no known way of telling what any individual's 'gene score' is.

What 'heritability' is actually supposed to signify is how far *differences* in IQ scores are due to *differences* in genes. That is, it estimates how much the existing *variation* in IQ scores in a given society would have been reduced if all individuals in that society had somehow, magically, been endowed with the same genes at birth. In that imaginary situation all remaining differences in IQ would necessarily be due to environmental differences, and so the extent to which this remaining variation was then less than the original variation would indicate the amount of the original variation due to genetic differences.

Note that this idea of 'heritability' is quite different from the average contribution idea. In terms of our earlier analogy, even if the *average* contribution of unearned income was relatively small, nearly all the *differences* in individual income might still be due to *differences* in unearned income, namely, in a situation where nearly everybody's earned incomes were pretty much the same.

'Heritability' as so defined might not seem a particularly natural measure of the influence of genes on IQ scores. And indeed it is not (though it is useful enough if handled with care). However, it has the great attraction that there are effective ways of measuring it. The

trick is to find a special sample where we know on general grounds that the variation in genes has been reduced by a certain amount, and see how far the overall variation in IQ scores falls in that sample. The classic example, of course, is identical twins separated at birth and reared apart. Since we know (without needing to know the 'gene score' for any particular individual) that such twins have identical genes, the extent to which their IQ scores vary less than those of pairs of people picked at random will give a direct estimate of heritability.

Not that identical twins reared apart are essential (which is just as well, since there are precious few of them). Non-identical twins reared apart, or even ordinary siblings reared apart, provide samples for which genetic theory indicates half the normal variance in genes, and so their reduction in IQ variance should be equal to half the heritability of IQ.

There are now well over 30 such surveys. Some are more dubious than others. In particular it is not always clear that the environmental variation in the samples has not surreptitiously been reduced along with the genetic variation, thus giving an inflated impression of the extent to which similar genes make IQ scores similar. (Thus it is arguable that adoption agencies offer a restricted range of middle-class family environments. And even twins separated at birth have the same prenatal environments.) But while this gives room to quarrel about the exact figures, it is only by resorting to desperate and ultimately absurd explanatory manoeuvres that anybody can continue to maintain that there is *no* differential influence of genes on IQ scores. (Perhaps the most conclusive single statistic is that non-identical twins reared apart are markedly less similar in IQ scores than identical twins reared apart.)

Now that we are clear about exactly what non-zero heritability amounts to, two important further points can be made. Firstly, and crucially for the political consequences, we need to recognise that figures for heritability do not measure some kind of immutable link between genes and IQ scores. They tell us nothing about the *potential* for environments to influence IQ differences, only about the actual extent to which they do so. As it is sometimes put, heritability is strongly 'population-relative': the figure we get depends crucially on accidental and perfectly alterable features of the population under study.

There are a number of reasons for this, the most obvious of which is that the heritability in a given population depends on the actual range of environments and genes which happen to be present in that population. For instance, in a population where everybody has the same kind of environment, differences in IQ scores cannot but be due to differences in genes, and heritability will therefore be 100 per cent. Conversely if everybody has the same genes, then all differences will perforce be due to environments, and heritability will be nil per cent. Both these possibilities, and all those in between, are equally consistent with a given mechanism ($IQ = aG + bE$) for determining

individual IQs. Thus, without anything else changing, a historical or politically induced increase in the spread of environments will by itself decrease heritability; and similarly an increase in the spread of genes will increase it. (Of interest in this connection is the tendency for British estimates of heritability to be higher than those from the United States: a number of writers have suggested that this is due simply to the existence of greater extremes of good and bad environments in the States.)

The second point that needs making is that the existence of significant heritability for IQ within the populations that have been studied does *not* imply that average IQ differences between races are in whole or in any part due to genetic differences. Blacks in the United States consistently score 15 points less on average in IQ tests than whites. Various writers—the most prominent being Arthur Jensen (2) and the most notorious William Shockley — have taken the heritability of IQ to show that these differences must have a genetic base. No such conclusion follows. To see this, suppose we have a population in which the methods outlined earlier indicate a heritability for IQ of, say, 50 per cent. And then suppose that within this population we compare the IQs of people with divorced parents with those whose parents stayed together, and find that the latter score a few points higher on average. Now there may just be a genetic explanation for this, but it is not particularly likely. And certainly the mere fact that IQ is 50 per cent heritable does not establish this: 50 per cent heritability allows that environments make a difference as well as genes, and parental stability might well be one of the environmental factors involved. And similarly with black/white differences: positive heritability for IQ leaves it perfectly possible that the lower average IQ scores of blacks in the States are due entirely to blacks having worse environments, and nothing to do with genes.

II

Let us now turn to our second main issue. What political consequences follow from the heritability of IQ scores?

Some commentators want to stop this discussion before it starts, on the grounds that what IQ tests measure is nothing to do with what we normally mean by intelligence, or, for that matter, with anything else of any serious interest. They argue that even the more respectable IQ tests are simply a set of tricks which happen to impress teachers and others in positions of authority, but which are of little further significance.

Perhaps these complaints about IQ tests are justified. But they are not entirely to the point here. For even if the ability to do well on IQ tests is trivial, the evidence still shows it is to some degree inherited. And if this intellectual ability is inherited, why not others?

Maybe there are reasons why not others. But rather than delve for such reasons, I think it is more illuminating at this point to ask why the critics of hereditarian claims protest so long and obstinately. Clearly they feel

that something important hangs on the issue, that crucial consequences will follow once we admit that any important intellectual abilities are heritable. But what are these consequences? *Why* are the sceptics so concerned to deny heritability? Once we raise these questions it turns out to be surprisingly difficult to find a satisfactory answer.

There is of course the initial point that many people view a position on the nature/nurture question as a badge of more general political affiliations: many people feel that an acceptance of hereditarianism would somehow be a betrayal of their liberal or egalitarian principles. But this by itself is scarcely much of an explanation (and still less of a justification). For it still leaves us with the question: why should egalitarian principles be thought to demand environmentalism in the first place?

Is not the answer simply that those who dislike inequality in general will be disinclined in particular to accept the evidence of genetic inequalities? But this cannot be the whole story either. A distaste for inequality in general scarcely stops people believing in *environmental* inequality. Indeed just the opposite is true: egalitarians not only recognise the existence of environmental inequalities, but positively go out of their way to expose them. But if a general egalitarianism doesn't stop people accepting the existence of environmental inequalities, why should we suppose that it stops them accepting the existence of genetic inequalities?

Perhaps the thought is that hereditarianism would show that existing inequalities are somehow in the nature of things, somehow inevitable. If this thought were right, then there would indeed be some reason to be suspicious of hereditarian claims. For such claims might well then be motivated by nothing more than the desire to discredit egalitarian programmes as doomed to frustration. But of course the original thought is a mistake: the heritability of differences in ability in existing populations by no means implies that such differences are inevitable. Even if a given population were shown to have very high heritability – even 100 per cent heritability – all that would mean is that environmental differences *hadn't* influenced IQ distribution (perhaps because there weren't many, or even any) not that environmental differences *couldn't* influence IQ distribution. There is nothing in positive heritability figures to imply that we can't alter the distribution of results if we so desire, by altering the distribution of environments. In particular, if we did indeed want everybody to end up with the same abilities, then there is nothing in the arguments for positive heritability to show we could not achieve this by giving compensating advantages to initially genetically disfavoured individuals. (Perhaps there are limits to the extent to which genetically disadvantaged individuals can be helped by good environments. But it is clear that high heritability figures in themselves do nothing to establish such limits.)

This last paragraph might be thought rather to miss

the point. Even if hereditarianism doesn't show that differences in ability are in 'the nature of things' in the sense of being inevitable, doesn't it at least show that such differences are *justified*, are just what we ought to find in a fair and reasonable society?

Here I think we come to the real reason for resistance to hereditarianism. Clearly many people feel that the world would be a better place if there were less inequality. But at the same time they accept that no reasonable objection can be made to inequalities which stem from differences in inherent capacities rather than from accidents of environment. Egalitarians with this combination of views will have as much reason as those above to be on the look-out for spurious hereditarian claims. For even if hereditarianism would not now imply that equality was unattainable, it would still seem to imply that programmes aimed at achieving equality were unwarranted, that they were illegitimate attempts to interfere with the proper development of natural capacities.

But even this last rationale for the resistance to hereditarianism proves upon examination to lack coherence: if it is unfair that different people should have different abilities, why should it be any less unfair if those differences are genetically rather than environmentally caused? The assumption, clearly, is that the most that can reasonably be done to ensure fairness is to have a society with equality of opportunity: if equal environmental chances still leave people with different abilities, because of their different genetic endowments, then there can be no remaining objection to those differences. But why so? If what is really wanted is equality of achievement, equality in the abilities people end up with, then why be restricted to equality of opportunity? If the ideal race would be one where everybody finished equal, then surely the obvious solution is to have a handicap rather than a scratch start. We have already seen that heritability doesn't at all imply that inequality is inevitable. So why not take the opportunity to arrange things to eliminate it?

Would not the social manipulation involved be undesirable? But note that we do not always take this attitude to the kind of social manipulation being suggested. Nobody would argue that dyslexics, say, did not deserve special attention just because dyslexia turned out to be a congenital defect. But if we think special help justified in that case, why not extend the principle to all cases of relative genetic disadvantage? Why not have a kind of reverse '11 plus', where those children with poor genetic endowments are selected at a certain age and sent to privileged schools? We needn't think of this in terms of the somewhat loaded metaphor of 'handicapping' – it need not be a matter of placing obstacles in the way of those who start above average so much as giving a helping hand to those who start below.

Still, perhaps the whole story does smack too much of 1984. The social engineering required to ensure educational compensation for all innate differences in

significant intellectual abilities would clearly be extremely costly both for freedom and efficiency. (And the same could be said of the alternative egalitarian strategy for dealing with unequal natural endowments, namely reorganising society, not so that everybody ended up with the same abilities, but rather so that unequal abilities no longer commanded unequal rewards. This reorganisation involved here would also clearly incur high economic and social costs.)

However, we need not here come to any decision about whether or not these costs are indeed too high. More important for our argument is the point that anybody who is genuinely worried about Big Brother in connection with arrangements designed to ensure equality of achievement ought probably to give up on equality of opportunity too. Ensuring equality of opportunity might not be quite as difficult as ensuring equality of achievement. But there would not be much in it. Consider the sources of unequal environmental opportunity. Children have different diets, different geographical situations, different amounts of reading matter available, different opportunities for mental stimulation . . . The list is clearly a long one. But if equality of opportunity is our aim, then differences in all these things will have to be taken into account and something done about them.

My point is not that steps in this direction would necessarily be absurd, but simply that they too would clearly cost a lot of social engineering. So if the undesirability of 1984 should stop us compensating for genetic inequalities, then surely it should stop us compensating for environmental inequalities too. That is, if our disinclination to engage in social engineering enables us to stomach inherited differences, then surely it should persuade us to swallow environmentally caused differences as well. What this then means is that even if hereditarianism is false, and all differences in intellectual abilities are environmentally caused, there will still be a range of unequal abilities in any reasonable society: even if all men start equal, without some provident hand to ensure they run in

similar conditions, they are surely going to finish different.

Some people are perhaps persuaded by the thought that since environmental influences are due to us (to society?), then surely we (society?) can undo those influences. (And perhaps this then leads to the further thought that environmental differences are our [society's?]*fault*, and therefore require remedying in a way genetic differences do not.) But these intuitions are full of holes. Whether we can or cannot undo something is independent of whether it resulted from human action in the first place. And even things which are the result of human action are not necessarily things for which those humans should be held responsible (as when those results are unintended and unforeseeable).

Let me now sum up. I have argued that the heritability of intellectual abilities does not automatically imply that inequalities in such abilities are justified: compensatory education could well counteract any differences in innate capacities. So if you think compensatory education is worth it you could have an equal society even if differences are inherited. Of course compensatory education would be extremely costly in other ways. But this argument tells as much against compensation for unequal environments as it does against compensation for unequal genes. So if you do reject compensatory education you wouldn't aspire to an equal society even if hereditarianism were false and all differences environmentally caused. Which is what I wanted to prove: that either way the question of whether or not individual differences are due to genes is quite irrelevant to any aspirations we may have to an equal society.

References

- (1) Block N J, Dworkin G, eds. *The IQ controversy*. New York: Pantheon Books, 1976.
- (2) Jensen A R. *Genetics and education*. New York: Harper and Row, 1972.

Correction

In Michael Green's commentary, 'Confidentially speaking'; in the March issue, the sentence beginning . . . 'If someone is pursuing a claim for personal injury . . .' in the third paragraph on page 23 should read: 'If someone is pursuing a claim for personal injury alleged to have been caused while he was looking after a patient in hospital, his solicitors are entitled to see in-patient notes, even though the doctor in charge had not consented.'