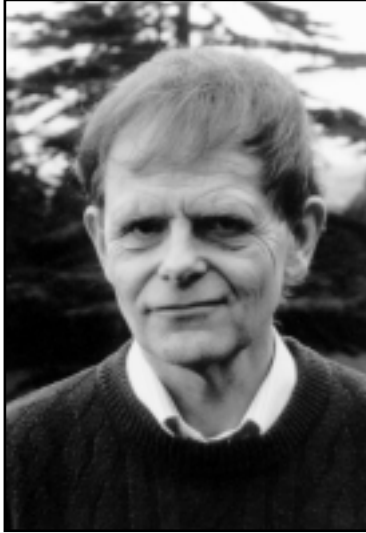


Can IQ change?



An individual's IQ score is often portrayed as a fixed and unchangeable measure of intelligence.
Michael J.A. Howe
argues intervention can produce lasting change, but it also needs to take account of a whole range of social circumstances.

CAN a person's IQ substantially change? Conflicting answers have been given. A number of prominent authorities on intelligence insist that an individual's IQ is highly stable and resists efforts to alter it. For instance, Murray (1996, p.145) states that with existing interventions IQ can only be raised 'in modest amounts, inconsistently, and usually temporarily'. The reason, apparently, is that 'an individual's realized intelligence, no matter whether realized through genes or the environment, is not very malleable' (Murray, 1996, p.150). Similarly, Rushton (1995, p.24) believes that 'intelligence is the trait with the strongest stability over time'. Consequently, it is argued, attempts to raise intelligence have been characterized by 'high hopes, flamboyant claims, and disappointing results' (Herrnstein & Murray, 1996, p.389). Responding to criticisms of an earlier version of their book (Herrnstein & Murray, 1994), Murray insists that we do not know how to raise the IQs of 'youngsters with a given tested IQ that would not (for example) allow them to become engineers' enough to make that a practical possibility (Herrnstein & Murray, 1996, p.573).

If they were found to be justified, these confident assertions that a person's IQ is largely unchangeable would have very gloomy practical implications. If the goal of increasing an individual's intelligence is not attainable, it is pointless to commit resources to achieving it. In that event it would be hard to argue with Herrnstein and Murray's (1996) pessimistic conclusion that only population-control measures can restrain the burgeoning of a permanent underclass made up of people with low IQs. In addition, establishing that IQ cannot be changed would lend credibility to the belief that intelligence is more than simply an abstract noun describing the state of being intelligent, and is an inherent and largely immutable mental quality or process that causes people to be intelligent to varying degrees.

On the other hand, firm confirmation of the assertion that IQ can change would have contrasting implications. Since people with low IQs experience various problems and difficulties (as is stressed by Murray, 1996), it would certainly be worth taking steps to raise the IQs of low-scoring individuals. Also, evidence that IQ is highly malleable, and possibly no more difficult to alter than those mental skills that are known to be acquired through experience and learn-

ing, would be consistent with the view that there is nothing unique or especially fundamental about those capabilities that determine an individual's level of performance at an intelligence test (Howe, 1988; 1990; 1997).

As it happens, the assertion that IQ is largely unchangeable is firmly contradicted by empirical findings from a number of sources. These findings provide copious and apparently convincing evidence of large IQ increases taking place. For example:

- Investigations of child adoption have shown that the average IQ levels of adopted children can be around 20 points higher than those of their biological parents and siblings (Capron & Duyme, 1989; Locurto, 1990; Schiff *et al.*, 1982; Schiff & Lewontin, 1986).
- Studies evaluating early intervention programmes such as those financed by the Head Start initiatives that began in the 1960s, and their successors, have yielded further evidence of large gains (Lazar & Darlington, 1982; Ramey *et al.*, 1984; Snow & Yalow, 1982; Wasik *et al.*, 1990; Zigler & Muenchow, 1992. See also Locurto, 1991).
- Additional findings indicating that intelligence levels are highly changeable have emerged from research investigating the effects of varying the amount of schooling young people are given, as a consequence of differing entry age (Baltes & Reinert, 1969; Cahan & Cohen, 1989), dropping out (Harnquist, 1968), or having their schooling interrupted (Rutter & Madge, 1976; see also Ceci, 1990).
- A variety of investigations, ranging from studies of the outcomes of changes in nutrition and the effects of curing infections to studies in which the influence of alterations in motivation is examined or that of test-related training is evaluated, have yielded further evidence that a person's intelligence can change. (See, for example, Johnson *et al.*, 1984; Nokes & Bundy, 1994; Sanders, 1992; Schoenthaler *et al.*, 1991; Stein *et al.*, 1975. For a broad view of this evidence see Neisser *et al.*, 1996.)
- Studies have demonstrated large inter-generational increases in intelligence test scores in a substantial number of nations. Improved social and educational opportunities appear to have been the main cause of these changes (Flynn, 1987; 1991). Although this research does not provide direct evidence of increasing IQ within indi-

viduals, it does supply strong additional support for the view that intelligence is malleable.

Evidence from all five of these sources firmly indicates that a person's IQ can be changed. Yet the authorities quoted at the beginning of this article insist that it cannot. The two opposing positions cannot both be correct.

Writers who have argued that IQ cannot be altered have been aware of at least some of the findings that appear to show that it is changeable. However, they have raised two objections which, they believe, negate the evidence that IQs can change. The first objection is that whilst it cannot be denied that changes in a person's IQ may occur, these changes are not permanent. Such changes, it is claimed, 'fade' or decay after some years. The second objection is that at least some of the observed changes in children's average IQs have been relatively small, and in some instances negligible. That is especially true, it is argued, of those increases in IQ scores that have resulted from educational intervention programmes designed to raise children's levels of mental competence.

Are either of these two objections justified? Do they invalidate the evidence that appears to confirm that a person's IQ scores can alter? The 'fading' objection will be addressed first.

The 'fading' objection

The objection that evidence of IQ changes can be disregarded because such changes are sometimes temporary rather than permanent applies to only one of the above five categories of evidence pointing to the changeability of IQ levels. (There is no evidence of fading in connection with the changes that have resulted from adoption and missed schooling, for example.) Nevertheless, this objection is a potentially important one. Apparent support for it is provided by the findings of studies evaluating intervention programmes. These show that some of the IQ gains that have occurred following children's participation in such programmes have diminished over a period of years, sometimes to zero (Herrnstein & Murray, 1996).

On closer examination, however, evidence that fading can take place does not invalidate the claim that IQ is changeable. Fading is neither mysterious nor difficult to explain. The majority of newly gained human abilities fade or decay in some circumstances. Such fading is especially likely when there is an absence of opportunities for new abilities to be used or applied. In the case of intervention programmes it would be inconceivable that the improvements

they yield never faded or decayed. Indeed, the particular circumstances in which early childhood intervention programmes are provided are ones in which the fading of recently acquired competence, through disuse, would seem especially probable. In the particular case of Head Start schemes, the conditions of life in the urban environments where they have been provided have often involved poverty, squalor, addiction, violence, unemployment, as well as poor housing and inadequate parenting. Together, these negative influences work to restrict a child's opportunities to practise and maintain recently-acquired mental capabilities, maximising the likelihood of fading.

The above account is more than just a plausible scenario. A four-year intervention programme for inner-city boys (Zigler & Seitz, 1982) yielded clear evidence that discouraging life circumstances make fading inevitable. The programme, which began in kindergarten and emphasized mathematical skills, was highly effective, but over the following years the initially large improvements diminished. Seitz decided to conduct an investigation in order to discover why that had happened. She found that the boys who had participated were simply not being taught the kinds of mathematical skills that were essential in order to maintain their above-average test scores. Seitz's results showed that the fading which took place was an inevitable outcome of the restrictions that were placed upon the boys' opportunities to learn.

The only state of affairs in which it would be realistic to anticipate that fading would not occur following an early intervention programme would be one in which the influence of the intervention was analogous to a kind of inoculation, or 'shot in the arm'. But that analogy has never been remotely appropriate for the circumstances in which humans develop and extend their mental capabilities. So although there is no denying that in some circumstances IQ increases fade, the fact that this can happen simply confirms that intelligence is changeable. In no respect at all does evidence of fading serve to refute the possibility of change.

The 'failure' objection

The second objection that has been introduced in order to attempt to refute the evidence pointing to the changeability of IQ is based on the finding that in some circumstances the effects on IQ of attempts to improve mental skills have been small or, occasionally, negligible.

A problem with this objection is that even if the vast majority of intervention studies had failed to raise children's IQs

at all, that would not be conclusive evidence that intelligence was unchangeable, for the same reason that the failure by several explorers to locate a remote island would not amount to proof of the island's non-existence. But with IQ, in any case, the claim that it is highly malleable is supported by numerous positive findings. Often there have been substantial IQ increases, amounting to as much as a standard deviation or even more.

In assessing the validity of the objection that not all changes in IQ scores have been large, it is helpful to consider the likely magnitude of an intervention that might be necessary in order to influence scores substantially. How big an intervention ought it to take to make a real difference? Some light on this matter is provided by an observational investigation which has revealed the extent of the differences in children's everyday circumstances underlying the observed differences between them in their capabilities. The study investigated the possible reasons for the finding that three-year-olds from different social classes vary in the size of their spoken vocabularies (Hart & Risley, 1995). These authors discovered that even by the age of three years, children in professional families had already heard more than 30 million words directed towards them. But children in working-class families and families on welfare had heard only around 20 million and 10 million words respectively. In other words, corresponding with the differences that were observed between the children in their language competence were truly massive differences in their language-learning experiences.

Further hints about the magnitude of interventions that might be necessary in order to increase intelligence test scores are gained by looking at the amounts of training needed in order to produce other major advances in knowledge and skills. For example, consider the quantity of musical experience a person needs in order to acquire reasonable competence as a performer. Reaching Grade Eight of the musical board examinations takes a strongly committed young player around 3,000 hours of instruction and practice (Sloboda *et al.*, 1996). Broadly comparable periods of time are needed in order to acquire expertise in other skill areas such as chess, foreign languages and various sports. Achieving professional standards in a domain such as music demands a much longer period of training, in the region of 10,000 hours (Ericsson *et al.*, 1993). In short, it takes a very long time and plenty of effort to achieve high levels of expertise, even in relatively narrow skill areas.

Now compare these large periods of time to the investments of time that have typically been involved in those early childhood intervention programmes that

have been evaluated on the basis of their effects on IQ levels. Up to the time in 1969 when Arthur Jensen made the much-cited assertion that compensatory education had failed, the majority of the Head Start programmes he was thus denigrating had lasted for no more than two months. Not until 1972 did it become customary to have programmes that lasted as long as a single year. Consider the total amount of a child's time that might have been involved in a typical two-month intervention. With four hours of attendance per day, five days per week, it would amount to no more than around 180 hours. In relation to the other durations we have mentioned, that is a rather puny amount of time, and hardly enough to have a large influence on a child's mental capabilities.

Even with a considerably more intensive Head Start programme, lasting for 36 weeks with five four-hour instructional periods per week, the total investment of time would still only be 720 hours. That seems much more impressive, and yet in comparison with the vast real-life differences in children's language inputs observed by Hart and Risley (1995), extending to tens of millions of words, it is actually a rather modest intervention. For a child of four-and-a-half living in a home environment with inadequate mental stimulation and few everyday opportunities to practise the new cognitive skills, even the impressive-sounding 720-hour period would represent less than four per cent of the child's waking time since birth. Regarded in that light, the finding that educational intervention programmes such as some of the Head Start ones have nevertheless yielded large IQ gains would appear to provide rather conclusive evidence that IQ scores are highly changeable. The fact that not all short programmes have produced large improvements is not at all surprising.

Further objections

Some further objections to the evidence pointing to IQ being changeable have been raised. It has been argued, for instance, that the mere fact that intelligence test scores usually tend to be stable, with year-to-year correlations averaging around .80, proves that intelligence is relatively fixed. However, that objection is easily refuted by pointing out that stability does not imply unchangeability. Other attributes such as a person's name or address, or their telephone number, stay the same from one year to the next, but no-one would argue that these cannot alter. Alterations in these attributes clearly

do take place whenever there are reasons for that to happen, and the same is true of IQ.

Another possible objection is that increases in IQ test scores are not necessarily changes in 'real' intelligence. Applied consistently, that observation could form the basis of a valid criticism that raised important issues. But those who have argued that intelligence is unchangeable insist on relying on IQ scores as valid measures of intelligence whenever it suits their purposes to do so, and consequently their introduction of the above point as an objection is unjustified.

Conclusion

There is massive evidence that IQ is far from being immutable. The objections that have been raised in relation to that evidence are not at all convincing. There are no clear reasons for insisting that it is qualitatively more difficult to change the mental capacities that determine a person's score at an IQ test than it is to alter those mental capabilities that are acknowledged to be acquired as a result of a person's experiences. The empirical findings provide no support for the pessimistic conclusion that low intelligence and the problems associated with it are inevitable and unalterable.

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