

# INTELLIGENCE AND SCHOOLING: IS THERE EXIT FROM THE MAZE?

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*This paper's aim is to put relationship of intelligence and education into a historical frame. One of its main arguments is that the effects of education on intellectual achievement of the population cannot be studied apart from politics, since it is obviously just as much a political as a psychological issue. On the other hand the impact of schooling can be measured only with a consideration of its long term cross generational effect. Compulsory schooling created a new norm of rational thinking and had a determining role in the recent history of modernity. However a majority of social scientists, anthropologists and psychologists share the view that intelligence is a substantial human ability and it does have organic base, human intellectual development is shaped by social and political institutions.*

**Keywords:** social policy as environment; intelligence and measurement; school system and meritocracy

## Intelligence and schooling: is there exit from the maze? IQ debates

The IQ debate is a typical case of those "eternal debates" that tends to re-emerge periodically, and in which seemingly the same arguments get repeated over and over again. There are many sources to read about the history of this debate with its recurring viewpoints. If we try to add something new, we need to investigate the process behind.

Let us start by drawing the main lines of conflict between the two sides of IQ debate. Among the extremely big amount of articles, studies, questions and answers, the greatest publicity – and the most passionate emotions – was evoked by the book of Herrnstein and Murray, *The Bell Curve*. As is well known, the book, based on a respectable mass of data and heavy statistical apparatus, tried to confirm the statement that intelligence is mostly inherited. The authors approve that intellectual capacities play an important role in achieving higher social positions. According to them it is nothing more than the fortunate historical coincidence of natural gift and social justice. One of the book's main statements is that educational policies to increase intellectual capacities are largely wasting money, and that there is in fact a genetic basis underlying the different intellectual levels and school performance of different races. The Bell Curve has been a best seller for months, in spite of its wordiness and the mass of statistical data used. It is not surprising that S. J. Gould, one of the steadiest critics of the hereditary viewpoint, in the latest and revised edition of his *Mismeasure of Man* declares with resignation: his and other researcher's arguments were not

enough to consolidate the idea that intelligence can indeed be developed and to augment the conscience of social responsibility concerning this matter. Moreover Gould feels that the first version of his book, published 13 years before *The Bell Curve* appeared had already given a valid refutation of it, even though he of course could not read the book at the time, only a similar article by the same authors.

The opposed viewpoints, outlined above, are described in an oversimplified manner in professional conversation, and even more so in comments to the public, I am afraid. My main argument is that individual human behaviour always has to be investigated in a dynamics of environmental influences. An error that often co-occurs with the mechanical understanding of hereditary vs environmental factors is to consider the entire process as a closed and determined system that can only provide us with one possible output. On the other hand in the case of intelligence it is not easy to find the boundaries between "individual trait" and "environmental effect". In the following part of this paper I'll try to tell more about these conceptual difficulties.

## Science and politics

Participants on both sides of the IQ debate are inclined to accuse their counterparts of driving on political and ideological grounds, whereas they claim their own position has a purely scientific basis. Ulrich Neisser says the following about this in his summary article written at the request of the American Psychological Society: "Herrnstein and Murray (and many of their critics) have gone well beyond the scientific findings, making explicit recommendations on various aspects of public policy. Our concern here, however, is with the science rather than policy." (Neisser, 1996, 78). And later: "Yee\* mocks this goal: "As if ...(science and policy) are easily separated" (p. 70) but it was part of our purpose to show that such a separation is not only possible, but fruitful." (1997, p. 79).

Neisser represents a widely accepted point of view that has been present since the beginnings of modern science and which can almost be regarded as an axiom. According to that psychology, (or more broadly speaking, scientific approach) and politics are two separate fields with radically different methods, concepts and truth categories. This separation has proved on the whole to be rather illusory. As Hayman claimed in his book "Intelligence, society and law" (1998) "...there is always a certain distinction between what we know and what we choose to believe. All knowledge "scientific" and "political" is both facilitated and constrained by culture that we make and that in turn remake us" (p. 251).

Many scientific and social facts indicate that the relationship of psychology and politics is in want of a new definition. Reconsidering these problems is important especially because the idea that science is the most authentic explanation of the world, has been recently a subject of debates. Moreover scientific approach seems to be more and more difficult to be separated from clearly ideological or esoteric ones. A new branch of social science, political psychology, set out to directly connect the two, science and ideology. Yet the renunciation of their separation – at least partially – can be fatally dangerous for the definition of science itself. Separation of factual-empirical knowledge from ideology is a normative axiom that defines modern science, an axiom which is a precondition of objectivity and impartiality. The other norm, impartiality is satisfied only if the observer is

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\* Albert H. Yee, another participant of the IQ debate, American Psychologist, 1996/97

able to maintain a distance from his or her own particular ideas and biasing pre-expectations. The present controversy (in which science and politics or ideology are becoming closer and their frontiers start to become fuzzy) may be a consequence of the existence of another determinative normative axiom of science. According to this any phenomena of reality – society included – should be studied in an objective way. The scientific identity of psychology and social sciences is validated by this latter axiom, as is the scientific nature of the impartial and scientific (psychological) study of politics. Yet in the study of human phenomena the accumulation of knowledge in recent decades raises the question as to what extent can *the observer himself observe impartially his own observational viewpoints?*

Investigation of the influence of the school system on the people's intellectual capacities, and the social advantage they can reach with them is particularly difficult because running of the school system is a part of politics. This is openly expressed both by Jensen and Herrnstein and Murray: the object of the observation is "the relationship between human capacities and social policy" – the question in hand is whether a capacity like intelligence can be developed by means of social policy. Many times the confusion about the definition of the problem occurs as soon as one wants to measure the efficacy of socio-political institutions or provisions by measuring changes as they appear in individual capacities. The addressee of the provisions of social policy is not the individual, but a social group defined in one-way or another: adults, children, low-income people or entrepreneurs. Education as a sort of institutional socialization is in fact a consciously designed and constructed system, in spite of the way it achieves a degree of autonomy. The policy that is directed to enhance the intelligence of a certain social group, is the *environment* in a broad sense.

## Intelligence and intelligence measurements

It is quite a trivial statement that cultures have an influence on the mental processes of the people living in them. But how is it possible to analyse cultural conditions in a logical and data based frame? One of the primary statements that I am to develop in this article is this: in certain social historical conditions cultural influences leave their mark on intellectual capacity in a way that can be represented by objective data. But let us first get into the elaboration of another hackneyed question: what is intelligence? Uncertainties in its definition do not seem to have been easily solved, even in the 1930s: one answer is the well-known definition of Boring (sometimes attributed to Jensen): "*intelligence is what intelligence tests test*". Has there ever been a more precise definition than this? Neisser, in his summary article in the *American Psychologist* gives the following definition: "Individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought. Although these individual differences can be substantial, there are never entirely consistent: a given person's intellectual performance will vary on different occasions, in different domains, as judged by different criteria." (1996, 77.)

Measurement and intelligence, according to my point of view, form an indivisible entity for two reasons: 1. Intelligence can only be seen by the light of accomplishment 2. In judging this accomplishment one cannot neglect sociological criteria. Let me quote Hayman again: "Nature after all does not dictate which qualities will correlate with cultural achievement. It is

for us to decide which aptitudes – which skills and knowledge, talents and abilities, cognitive and affective traits – are valuable and which are not. We could exalt formal deduction or creative analogic reasoning, or practical problem-solving skills, or moral reasoning, or emphatic judgment and interpersonal skills. We decide in other words, what will count as "intelligence" (1998, 22.).

Inseparability of intelligence and measurement is reflected by the fact that the notion of intelligence in a modern sense did not exist before it had started to be measured. In fact measurement emerged in many forms to study problems of culture and society under the influence of the positivist scientific model: in the field of psychology, one could mention the well-known test of personality, attitudes, neuroticism and other characteristics. The basis of all these measurements – like that of intelligence as well – is the standard: individual features are compared to similar features of the majority, the multitude or some well-defined group. The precision of the standard varies however: the more general the appearance of a characteristic is and the broader the group of people who possess the characteristic, the more probable it is that a general normative system can be worked out. The capacity for solving problems at an intellectual level can be regarded as a universal human ability, yet for this ability to be measured, it was necessary to develop a common system of requirements for comparison. It is at this point that the emergence of today's intelligence concept shows its other peculiarity. The school system, as a device of socialisation has a basic aim and function in modern states: to make young generations internalise the accepted view of the form of intellect. To achieve this, on one hand it defines the boundaries and characteristics of intellectual performance and on the other hand it makes the thinking and problem-solving methods of the majority of a particular group universal. All the advantages and disadvantages of school stem from this circumstance. In modern states in the past 150 years an educational system and a standardised system for intellectual performance developed together, that means – just as it does in any other system relating the individual and the environment – that they are mutually determined and that modifying important elements of the interaction will have a repercussion on the output of the system.

Does this mean that intelligence is not a natural human characteristic, but rather an artefact of measurement? According to my assumptions this is not so. The inclination and capacity of understanding the world is perhaps the most characteristic universal human features or at least this has been the view of European philosophy from antiquity until present times. Also since ancient times observations about the development of children agree that the most important element of stepping into adulthood is intellectual development. Thus there is a historical continuity in considering intellectual abilities to be substantial human characteristics, that everyone possesses to a certain degree, or, if not, he or she is deprived of certain rights and responsibilities available to others. All justice systems take into consideration the state of *compos mentis* of their subjects inside their own cultural conditions, and the lack of the ability to take responsibility is the reason why the actions of the mentally deranged and children fall under a different judgement. As we can learn also from artistic literature and history of culture, intellectual skills have always had a role in getting ahead in society/social advancement. Since modernity intellectual faculty has gained a protagonist role and along with this the development of the masses and the measurement of changing attitudes of individuals and groups to this system of influences have fuelled cumulatively technical advances. Philosophers of bourgeois society saw the fairest alternative to socially inherited privileges

in reliance on the characteristics of a person. In this model (based on meritocracy, to which we are going to turn back later) individuals reach their position in the social hierarchy according to their intellectual abilities. Thus one of the principal questions reappearing periodically in the IQ debate: to what extent is the advancement of individuals up to their intellect in compliance with social justice? Social ideologies of the 20<sup>th</sup> century – socialist as well as bourgeois democratic ones – sharply criticised social arrangements, given by the nature, but maintained existing principle of giftedness. In contemporary societies most of decisions that influence significantly children's fate are based on some kind of a measurement of intellect, from entrance exams to filtering the mentally retarded. Without doubt the pivot of the question is whether intellectual faculty is really naturally given, inherited, or it is shaped by external effects? If it is mostly inherited, social hierarchy can be placed on a firm biological basis and the idea of meritocracy should be discarded. However the bourgeois societies created the norm of meritocracy based on intellectual abilities *as opposed to those conditions of social advance that cannot be influenced by the individuals, but are determined from birth.*

### Schools as intelligence-designers

As I tried to show, the evaluation of the role of schooling is a fundamental part of the IQ debate. Thus we need to clarify the differences between the principles supported by the followers of Jensen and the other side of arguments, according to which it is schooling that have a defining role in unfolding of intellectual skills. I share the opinion of the latter, arguing for the fact that schools from modernity are designers of intelligence. While the authors of *The Bell Curve* and Jensen regard schools as essentially not being much more than the register and measurement of human differences, much like the IQ test itself, I claim that school system has crucial mediating role between individuals and society. Compulsory schooling from a tender age offers individuals knowledge that are considered valuable in a given culture. Schools' curriculum always reflects the norms and expectations of decision making groups about literacy and intellectual capacity. Various grades and sorts of schooling – in principle – offers individuals a choice that makes them to be able to form their own relationship with other institutions of culture in accordance with their own inclinations. If we expect individuals to be able to choose between the possibilities of social advancement in a way that suit best to their abilities, then we have to provide them with a experience that reflects later living conditions with great fidelity. There are risks in this situation, namely that schools will set up requirements that only a certain number of the individuals of a given society can match, while the rest stay excluded. Yet, without schools this organised and (in theory) available-to-all system of mediation would not be possible. This mediation will not succeed, however the conditions presented by schools differ from the conditions found in social reality in a wide range.

Rarely achievements in intelligence tests and school performance coincide completely (on the other hand unfortunately school performance is not well defined in most of the studies). Research results usually show a correlation of 0,5-0,6 between the two. Yet both IQ tests and school requirements reflect mostly a concept of intellectual faculty, accepted in their culture. If not, they are likely to measure something that is socially irrelevant. This danger lurks behind the attempts to broaden the scope of intelligence that Gardner (1983) offers as an alternative to the stigmatising

and excluding concept of unitary intelligence. Gardner thinks that the concept of multiple intelligence has to be created not only from the examination of normal children, but from the examination of talented ones, brain damaged patients and on the curious performance of idiot savants or prodigies. He thinks the investigation of diverse abilities valued in different cultures should not be excluded either. Gardner's definition of intelligence sounds extremely democratic as it does not exclude a single human capacity or quality. This point of view, though, ignores the fact that intelligence can only have practical meaning if it can be linked to the norm of the majority and existing social demands. One could declare that some of the abilities of brain-damaged people can be considered as intelligence, but this intelligence cannot be commensurable or comparable with the performance of the majority of the population.. On the other hand it does not predict a lot concerning the fate of individuals than standardised IQ tests. Thus expanding the notion of intelligence – like any other quality – may have the consequence that the concept gets devaluated and finally emptied. Practical consequences could be a lot more serious than it would be in the case of an "ideologically one-sided" concept of intelligence, because it becomes increasingly difficult to have a clear picture of the question. Walsh (1999) has every reason to draw our attention, citing Thomas Sowell, an American economist, to the consequences of not using a test only because by doing so it would bring to light certain social inequalities. As a result of not being measured, these differences can be buried deep down, and those who really are in an unfavourable situation will be condemned to remain so. It is not the measuring device that has to be thrown away. Rather we should examine the nature of the inequality and its background.

The same (with certain restrictions) is true concerning relationship of intelligence, school education and minority cultures. As we have mentioned earlier, one of the goals of compulsory education is to level out the abilities and performance on certain intellectual tasks of growing up generations in accordance with the norm of the majority. This is the only way to provide a relative equality of chances for everybody. We might entirely agree with Boykin (1994) mentioning the hidden curriculum of schools. According to that we want that children sit calmly in class, we organise their time and are continually sending them cultural messages. But these cultural messages are, on the other hand, the signposts that lead the members of the minority on their way to social advancement. It is not only possible but is even necessary to try and introduce the members of a minority into the culture of the majority. It would be a distortion of truth if we present them with the illusion of a possibility of choice in the priority of cultures, or if we at least do not make the social consequences of such a choice clear (see the pharisaic proposition of Jensen according to which we should develop black children's abilities in the 1<sup>st</sup> type abilities – that weigh less in standard IQ scores). The imposition of a prerequisite is the achievement of western type socialisation and education, not only in certain countries, but also in the entire world, and is one of the main results of globalisation.

### The functioning of school and intelligence as a system

There is a multitude of data and research results about the close relationship between schools and intelligence. Neisser (1996), for example, reports many data supporting the view that measurable intelligence is inseparable from schooling. Children grown up in American or western cultures perform better on IQ tests than do children of the same age living in backward

regions, even if the test is "culturally unbiased". (The efforts to create a "culture-fair" intelligence test have faded away with time. It proved to be wrong that non-verbal and non education-based tests could provide a result that is independent from cultural settings. I shall turn back to this when talking about the relationships between motivation and intellectual abilities.) Those children that stay temporarily out of school perform worse on IQ tests than those that attend school regularly. A typical demonstration of this was the case in Virginia, US, in the 1960s, when several schools were closed down, so as not to be forced to integrate black and white children, and as a consequence black children were left entirely without education. The intelligence of these children with each year spent out of school dropped 6 points on average, compared to their age-matched group. A generation earlier, in the second half of the 1930s, the difference between the IQs of urban and rural populations of the USA was significantly different (by 6 points). This difference fell to two points by the 1960s. Augmentation of the technological requirements of rural work and farming techniques, and thus the appearance of schools of significantly better quality, played an important part in this diminution (Neisser, 1996, 87). Frumkin (1997) in his comment on Neisser's study draws the attention to the researches of Yerkes and other army psychologists concerning the IQ of blacks. Yerkes et al. found that black people who came from the three northern states (Ohio, Illinois and Indiana) had higher IQ scores than whites from the seven southern states (Arkansas, Mississippi, North Carolina, Georgia, Louisiana, Alabama, Kentucky). Yerkes put down this difference to the fact that in northern states the quality of schools was better and the level of living standards higher. In the second half of the 1920s Peterson and Lanier compared the intelligence of black and white people, and they assumed that black people from the north performed better because it was a more intelligent population of blacks that had moved into these states. Otto Klineberg, the famous geneticist, proved this assumption to be wrong in his 1935 longitudinal study and showed that the first generation of blacks in the north did not differ from blacks in the South, and the results obtained in northern states were clearly dependant on how much time they spent in better schools and with better living standards. Lee confirmed the Klineberg's results, studying black people who had moved to Philadelphia. He found that the intelligence of black children, from the moment that they started to go to school in Philadelphia increased half a point compared to that of age-matched children. Neisser draws attention to the fact that children who go to very low quality schools start to decline in their IQ scores, with the curious result that older children show worse performance than their younger brothers or sisters.

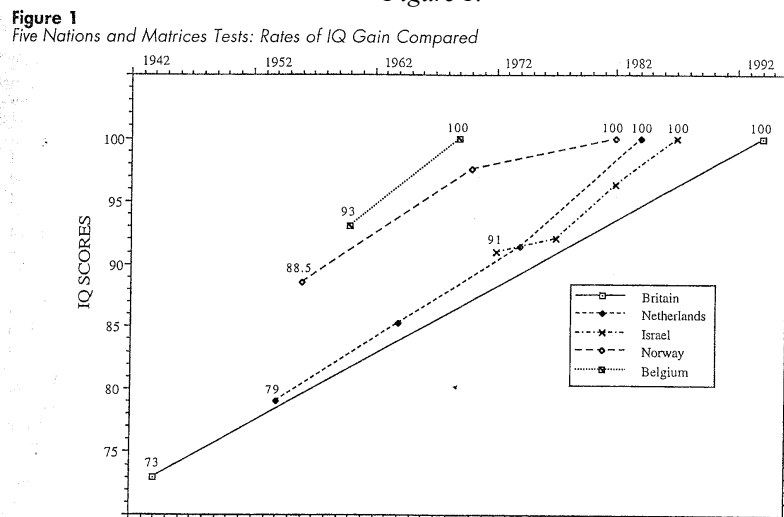
In another article, Neisser (1997) refers to a study in which two scholars, Cahan and Cohen investigated which variable shows greater effect on intelligence: age or the number of years spent at school. Results showed that time spent at school showed a higher correlation with intelligence than age. This correlation was even valid for tasks the solutions of which children did not study at school, such as the Raven test. Neisser also points out that the influences of school and intelligence are inseparable since in all cases from a certain age children go to school in all industrial countries.

But the most convincing fact of the mutual effects of schooling and the intelligence scores is that intelligence tests have to be re-standardised from time to time. New standards becomes necessary because tasks after a certain period become too easy for the younger generations. The mean IQ has risen considerably compared to the IQ of age-matched children 10-15 years ago. Its discoverer named this peculiar phenomenon on the "Flynn-effect" after

himself. Flynn (1999) analysing data from a sample of the United States army found that there were some participants that filled in both the 1947 and the 1972 tests and scored 8 points higher on the latter. After receiving many criticisms he conducted a meta-analysis of 73 studies involving 7500 participants in total, aged between 2-48 and his conclusion was that the IQ score of Americans jumped up 14 points in the past 35-40 years. It is a peculiar paradox, that these past two decades were exactly the ones that saw the gradual fall of SAT (Scholastic Aptitude Test) scores in America. Jensen, when acquainted with this finding made the proposal that culturally independent tests should be chosen, so later the Raven-test became more and more popular. This in turn shed light on the peculiarity mentioned above, that quite surprised participants in the IQ debate. Even though for outsiders it may seem that the Raven test is culturally less biased than the Wechsler test with its multiple scales and questions based on culture, yet results seemed to show that Raven scores reflected cultural differences with even greater precision, than did complex IQ tests.

Later Flynn realised that the international data concerning western countries fall into the same pattern as the American ones.

Figure 1.



Note. Every nation is normed on its own samples. Therefore, although nations can be roughly compared in terms of different rates of IQ gain, they cannot be compared in terms of IQ scores. That is, the fact that the mean IQ of one nation appears higher than another at a given time is purely an artifact. Sources for these data are Flynn (1987b, pp. 172-174), Flynn (1998d), Raven, Raven, and Court (1998, Graph G2).

(Flynn, 1999, p. 7.)

The temporal changes observed in intelligence scores lead Flynn to two conclusions: on the one hand, whatever IQ scores measure, it is not an inherited or heritable intelligence and on the other hand IQs measured in different cultures are simply impossible to compare/incommensurable. Take height as an example, writes Flynn. He himself experienced that though in the beginning of his career, he was taller than most of his students, he was forced back into a medium category later. If statistics about intelligence prove to reflect the same individual position-shift, then in the case of a Dutch teacher the ratios would have changed completely by now. A teacher, that was smarter than 75% of his students in 1952, by 1982 would only be smarter than 25% of them, while common people (or rather students that can be tested with adult IQ tests) would have gained 20 points. Flynn thinks it utterly impossible that these gains in IQ reflected in IQ scores actually reflect a real increase, and he thinks that these must basically be artefacts of the measuring procedure, and show no augmentation in "real intelligence". He claims both alternatives impossible: neither could the older generation



have been mentally retarded, nor can this current generation have such a high percentage of geniuses (14%). Yet Flynn was mistaken, because all he considered is the quantitative side of intelligence and he failed to notice that making the new standard became necessary exactly because the norm is changing. It is true, norms could have become more lax as well, but in the period examined by Flynn the situation can assume to be the contrary.

To assess the complexity of this issue – and to support the special role of schools – let us examine a Hungarian set of data collected by Victor Karádi. The study of Karádi was originally intended to investigate the participation of different religious groups in education. In Table 1. there is a summary of how the ratio of academic failures changed across the different denominations between 1871 and 1939. We might be more interested in the radical drop in the overall number of failures.

*Table 1. The number of children, repeating the first class of elementary school, by religion and period*

<b>Religion</b>	<b>1871/72- 1872/73</b>	<b>1881/82- 1888/89</b>	<b>1908/09- 1911/12</b>	<b>1925/26</b>	<b>1939/40</b>
<b>Catholic</b>	199	183	110	105	38
<b>Calvinist</b>	253	155	96	82	34
<b>Lutheran</b>	136	148	92	93	27
<b>Jewish</b>	140	135	70	43	13

As the Table 1 shows, at the end of this era the number of failures dropped to one-fourth or one-tenth compared to the beginning in the last third of the XIX century. What can this reduction be attributed to? Karádi, as it is not a major thesis of his topic, only mentions it as an aside, and writes that "it shows the permanent improvement of the adaptation of the entire population to schools"(and very likely is in accordance with the fact that schooling became widespread among parents as well – Karádi, 1997, 21). It is astounding that the participants of the intelligence debate have not paid attention to this fact, well-known to common sense and educational policy. The school career of children is significantly influenced by the number of years their parents have spent in education, so the influence of schooling is *delayed and cumulative*. Karádi's study is particularly valuable, because it shows both particular and general effects of schooling. The data basically reflect what can also be observed on the level of individuals: members of the different denominations have different attitudes to school requirements and consequently the proportion of the children that get into school from a particular group is different in each case. This does not change the fact however that even among children from the catholic group, who showed the least affinity with school education, *there were four times as many children who finished school without having to repeat a year than there had been thirty years earlier*.

The same question can be raised concerning IQ measurements: can it be decided whether children became cleverer and so failed less at school, or was it the general standard that became lower? It is reasonable to assume that children in fact became better-fitted to meet school requirements, or at least this is supported by the fact that since obligatory schooling became social practice in Hungary – just as in other western type cultures in this era – a certain process started, first slowly and then at an increasing speed, a process that is usually called the expansion of education. In other words, there were more children achieving a higher educational level.

At the same time, the syllabus – it is enough to have a look at contemporary textbooks – became more difficult and more extensive. Flynn

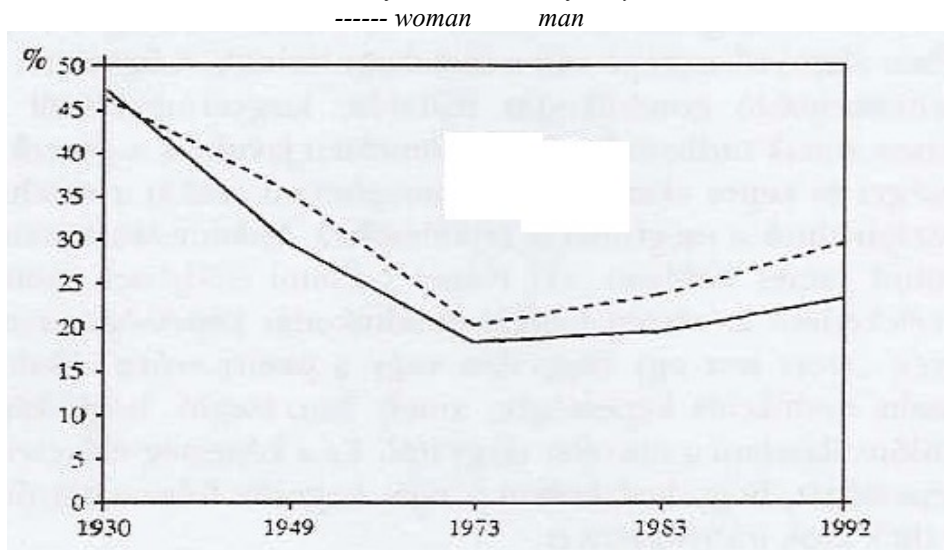
thinks that this massive increase in intellectual performance should have resulted in a flourishing of cultural output. And indeed one of the main achievements of the past 150 years was undoubtedly this flourishing, which can easily be proved by pointing out scientific-technological development and certain social-economic events. So it is not Flynn, but professor Halsey from Oxford University with whom we should agree, who writes in a foreword to a work by Schiff and Lewontin "Our power over our lives is immensely greater than that of our ancestors not because we are genetically different from them, but because we have found ways of storing and using interventions. Cultural evolution has made us more able to live longer and to dominate our world much more than our forbears. We are much more clever though our mental capacity has not changed (1986, VI.)

Concerning the study of Flynn, Neisser notes the following (1999): there is no explanation available as yet about the increase in intelligence from generation to generation, but it cannot be excluded, that we find that the same factors influence the existing social differences. This assumption is present in the work of Flynn as well, who wrote that Blacks have enjoyed a slightly higher rate of gain on Wechsler-type tests than Whites. This implies that, since 1945, Blacks have gained at an average rate of over 0,30 points per year and have gained a total of 16 points over 50 years. Therefore the Blacks of 1995 would match the mean of IQ of the Whites of 1945. An environmental explanation of the racial IQ gap need, therefore posit that the average environment for Blacks in 1995 matches the quality of the average environment for Whites in 1945. I do not find that implausible" (p. 15)

Ágnes Bokor had a similar view of the situation in her 1987 book, "*Poverty in contemporary Hungary*". Bokor found that in the evolution of deprivation – this category refers to the relative definition of poverty, the main influencing variable was educational level. About distribution in age, she writes that (77): "The most impressive marker of the difference of educational level between deprived and non-deprived people is that in the *age group above 60 among non-deprived individuals the ratio of individuals with less than 8 years of education is the same (49-50%)*. Maybe we can put it this way: from this point of view deprived people *are lagging some 25-30 years behind.*"

Even though compulsory education could not have been carried out against the resolute resistance of the population, one cannot deny the fact that in many countries there was state or official pressure representing a long-term ideal of social justice opposing shortsighted individual evaluation. Naturally, this pressure could not have been strong enough, if the workforce of children in families had not become superfluous or if the idea had failed to spread about the prospects of schooling as an authentic means of social advance. Later generations entered the system with higher education level and more and more knowledge and they were increasingly motivated in getting their children to achieve an even higher educational level. In countries belonging to western cultures there were, without doubt, periods when a higher educational level was a sort of guarantee for getting into a higher social status . Yet a few elements of the middle class, such as the possibility for their children to study and advance was given to people who even to those that did not manage to attain a high educational level. Meanwhile there was a definite change in the people in certain positions. As an illustration, let me present again a Hungarian data. In the book of Andor and Liskó (1999, 28) we can find the following figure:

Figure 2: How many percents of the people being on higher level of employment descended from a low class family?



Here we can see that between 1930 and 1973 there is a steep decline in the number of people in higher positions whose father had a similar position, or to put it another way, in this given period in the higher levels of the hierarchy the number of individuals increased who had risen higher than their parents. Maybe there is no need to go on verifying that a similar process – even if its velocity, inclination or temporal limits might have differed – was present everywhere as a concomitant phenomenon of modernisation.

### How does school mould intelligence?

As Neisser also points out (1996), school has many ways of influencing intelligence: among other things by passing on knowledge, regular problem solving, creating the routine of abstract problem solving. But apart from all these we have to assign at least an equal amount of importance to the various levels and strata of motivation that take part in forming rational thinking. By this I don't mean primarily those motivational relationships extensively studied in pedagogical literature that accompany the process of studying itself, but those metacognitive processes that are needed in order to be able to deal with any problem rationally. It is a widely accepted conclusion of developmental psychology that metacognition has an important part in the development of cognitive functions. Much of the development of attention, memory and problem-solving from early childhood to adolescence can be attributed to the fact that self-representational abilities of children get significantly better and they can activate at will those processes that contribute to the development of cognition. As Moshman points out, both James Baldwin, one of the theoretical predecessors of Piaget, and Piaget himself thought that the ability of logical thinking is closely linked with the way that the individual "takes into possession an independent or a priori force" (Baldwin), which Piaget calls the ability of formal deduction, that helps to separate the operation itself from the subject of the operation. This ability presupposes another ability, the possession of knowledge about one's own cognitive processes and the ability to control those processes.

Current research into the field of cognitive operations showed that the seeds of causal thought and logical deduction are present from a very tender

age. At the same time it cannot be disputed that an adult or even a 14-year-old is more likely to be able to foresee or to understand complex relations than is a child. Moshman (1997) offers a model of interpretation of cognitive functions that explains the duality of these functions by differentiating between routine-like conclusions or inferences, and their conscious control in logical deduction.

Inference, according to Moshman's definition is the generation of new knowledge from existing knowledge. Inferential thinking thus plays an indispensable role in all areas of human cognition, it is unconscious and automatic. We are continually making inferences, for example while reading, and contacting or collaborating or talking with others supposes the continuous stream of inferences about the other's intentions or actions. Thinking is nothing else but the ability to control our inferences intentionally in order to solve a problem or a task. If we use this definition, then the ability to think is not limited to post-adolescence and it becomes obvious that children are able to make problem-solving inferences from a very early age. From this it follows that a two-year-old child knows that if he or she has a red and a blue ball, and she can see the red ball, then the one she has to find has to be the blue one. The ability to think evolves gradually as a step-by-step handling as these inferences come under conscious control. However the ability to make automatic inferences remains in adulthood as well. Moshman points out that reflective, logical thinking is a purposeful action, the quality of which cannot be evaluated without studying the extent to which the individual has reached the proposed goal. Individuals can only get hold of this ability if they are continually evaluating their own cognitive processes inside the normative frames of rational thinking. "To the extent that an individual attempts to constrain his or her thinking on the basis of self-imposed standard of rationality, we may say the individual is engaged in reasoning. Reasoning, then, is epistemologically self-constrained thinking" (1997, 953). So metalogical abilities are indispensable in the development of logical thinking: even small children suspect that there are possibilities and probabilities and are able to carry out deductions, but only advancing towards school age do they become able to control the validity of their inferences and know whether these inferences can be applied in a certain situation. For rational thinking to become dominant it is also necessary that a norm that dictates rational thinking should become part of one's identity. In other words rational thinking is a human potential that all human beings possess, yet in order to realise this potential it is necessary that the individual should define and consider him or herself as a logically thinking entity.

Just like Moshman, Demetriou also emphasises the importance of self-reflection in the development of intelligence in a comment on the fiery debate lighted by Jensen's new book. His point of view is very interesting, because Demetriou accepts completely the modular theory of mental functions, which Moshman only considers valid for a certain group of mental operations. However, the existence of *g* and the strictly defined isolated cognitive modules hypothesis contradict each other. Demetriou believes he solves the problem by denying the biological characteristic of *g*. He thinks that *g* is a psychological construction that forms part of the self-image of an individual. "In fact we have also shown that fast processing and high analogical reasoning with ensuing self-representation are positively and systematically related to the dimension of openness to experience, one of the Big Five factors of personality. These findings suggest that the projection of processing power (or *g*) onto one's self image of cognitive efficiency shapes general mental self-worth and self-esteem. Through this it shapes decisions about what tasks one works on and how. In turn this engrafting of *g* onto the

self representation system influences the person's problem-solving strategies and thinking styles. This obviously shows psychological nature of g by any definition. Even more: in the long run, it contributes to the formation of g because the more one has of it the more one works to augment and differentiate it." (Demetriou, 2000).

Demetriou's point seems to be exactly the opposite of Jensen's view according to which the g factor of intelligence is by nature biological and can only be modified biologically. In reality both points of view get tangled in the same confusion. One of the axioms of positivist thinking is that psychological functions always have an organic – or if we like biological – ground. Who would nowadays defend the view that in acquiring knowledge there are no biological changes in the brain? Would anyone try to deny that orientation reaction, leading to an increased sensitivity to stimuli can be characterised by well-defined biological changes? It's been nearly a hundred years that the science of psychology does nothing but search after bodily correlates of untouchable and elusive mental processes. According to materialist philosophy the organic and the mental can never be completely cut off from each other, even though their exact appearance, meaning and functions might be different. It is pointless to argue about whether g exists on a biological basis – as I have shown earlier there is nothing that justifies denying this. Also, it is hardly a matter of disputes that rational thinking and problem solving requires the intentional control and synchronisation of cognitive operations and functions, so we also have to postulate a psychological g that serves as a central controller<sup>1</sup>.

I would like to argue for the biological basis – universality – of g as well, citing the views represented by Augusto Blasi, a researcher on moral development. The convincing force of a correct logical step originates with motivation connected with intellectual insight exclusively. Even though the fact is frequently mentioned that logical thinking is a peculiarity of western thinking, it should not be neglected that members of all cultures can understand the same logical argumentation and this is why they are able to adopt and even to develop the technical innovations of western culture.

If we are to accept that the abilities represented by intelligence-scores do in fact exist as a psychological feature, then we have no reason to deny that this ability has its own organic ground and consequently neither should we deny that its development has the same conditions and possibilities as does that of any other psychological or bodily feature. All these particularities appear before us as phenotypes, forged in the complex dynamics of genetical inheritance and environmental influences.

## School expansion and its repercussion in intelligence

Institutional changes of education occurring in the recent past are often referred to as expansion. We see a curious paradox here: while children spend increasingly longer time at school, many signs show that the state-unified school system cannot from any point of view adequately fulfil its socializational role. We do not have the possibility to discuss this here (and there is abundant literature on the topic<sup>2</sup>). Recent data also indicate that extended studying periods in developed countries do not contribute to a

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<sup>1</sup> I am convinced that this is where the difficulties stem from in the field of computer modelling of the nervous system. The difference between the human and the computer-based model of thinking is the same as between a real dog and a robot dog: both of these can yelp or even both can be taught to recognise their owner, yet the robot dog will only do all these if it is turned on.

<sup>2</sup> See for example Halsey et al., 1998, 645-677

further increase in intelligence. Emanuelson et al. (1993) for example conducted a study in Sweden involving more than 10 000 subjects and found that the improvement started in the 1960s came to a halt in the 1980s, and currently there is even a slight decrease. There are some very interesting data that show that differences in results between the sexes augmented as well as differences between 12-13-year-old children from different social strata. These data are very important because they come from one of the richest countries and one that gives a good social support to its citizens. An inevitable consequence of this situation is that the final losers in these changes in the educational system are those who formerly did not manage to get into the modernisation process. These include certain ethnic groups in the United States, in the United Kingdom and – not to go any further afield – in Hungary.

Ornati (1982) claims that the historical differences between blacks and whites in terms of the number of years spent in education, the ratio of people in higher studies, and number of degrees, had decreased drastically by the beginnings of the 1960s, and, moreover, illiteracy had disappeared entirely among the black people. Yet these quantitative changes – declares Ornati – were not accompanied by better quality. Badly prepared teachers using bad syllabuses taught black children, schools were overcrowded and were very poorly equipped with books and other teaching material. Moreover, school success of blacks was not reflected in their income later. Despite the fact that they spent more time at school, blacks were still stuck with badly paid, low-status jobs. In the same employment group blacks received less income and this was even more so in jobs that required higher training than the national standard.

Neisser (1999) also presents the results of NAEP (National Assessment of Educational Program) that show that between 1970 and 1990 there is some increase in the reading and mathematical abilities of 13-17-year-olds. Study along ethnic lines though, clearly shows that this gain can be attributed to the better results of black and Spanish-speaking students and that the performance of white students remained unchanged. The cumulative effect of schooling (which reinforced school socialisation in the middle-class white population) does not work if by finishing school people do not get some social advantage, as did most of the grand-parents and great-grand-parents of the current middle-classes, who were thus prompted by their own experience to encourage their children to study in secondary and higher education.

The unpredictability of life trajectories and the confusion of the possibilities of social advancement made rational self-reflection impossible and senseless. A widespread and infinitely described observation is expressed by Raymond Boudon (1981) who claimed that people of the lower social class are inclined to believe that success is a result of components that they cannot influence. Social advances for these people are mostly results of good luck, and not a result of effort as it is for the middle class people.

Rational identity and self-reflection reflect two real and radical cultural differences between people socialised in western cultures and those who were left out of this socialisation. People of the third and fourth worlds, or, to quote the original words of Neisser, of caste-like ethnic minorities living in a majority culture. This is the difference that the followers of the heredity principle call evolutionary (or related) adaptation strategy.

Jensen and the authors of *The Bell Curve* say that the more uniform, the more standard the environment, the more inherited features influence advancement in society. N. Weidman (1997, 142) poses the question, whether the society of the USA can really be considered such a uniform

environment. This is the crucial question: Herrnstein and Murray did not make it explicit, and their statements have a hidden but definite political presupposition, which they accept without any analysis that American society meets their expectations. The endless gramophone disc effect comes from the intention to understand moving and interactive phenomena, while considering it static.

### Summary: inequalities and human societies

Meritocracy (the idea of evaluation or social advancement based on merits) is a key political theme in the debate about intelligence and environmental factors. Flynn in his article clearly takes a stance against meritocracy. The main point of his arguments is that inequalities cannot be torn out of human societies, and that evaluation based on merits necessarily conflicts with the principle of equal rights. Moreover, solving the problem of inherent inequalities, given such a poverty rate, seems as impossible task. He thinks that we have to discard the grand ideal of trying to eliminate the inequalities of the environment and aptitudes because the attempt would only lead to the development even greater differences.

Golthorpe (1998) points out that although the ideal of meritocracy is a very popular one both in British traditions and in American public opinion, its realisation faces difficulties. We come up against the first difficulty in defining merits. Are there any merits that carry a similar meaning for people in different social positions? On the other hand, even if we could reach a social consensus regarding relevant merits, we still face the danger that those who fail to achieve a satisfactory advancement in the hierarchy of merits will feel themselves handicapped. He also quotes Hayek, who makes it absolutely clear that in market societies meritocracy cannot be a central issue, because the values of the market may not coincide with the list of officially declared merits. Yet Hayek believes that individuals have to be convinced that their well-being is a function of their own decision and efforts while education has to support this belief. Meritocracy is therefore a "necessary myth". Golthorpe is doubting whether this kind of myths can survive for a long time.

Different cultures may have very different ideas about merits. In European cultures this ideal is tightly linked to middle-class and democracy. Merits in this culture are definitely not identical to inborn characteristics or abilities, out of reach of the individual's influence. As we have shown, advancement depending on merit was born exactly as an alternative to inherited privileges. A society based on meritocratic principles is not egalitarian, yet, as a core feature, it is not a closed society, in the sense that social positions do not have a permanent and unchangeable cast and the efforts of the individual do have certain relevance to social advancement. If social advancement is proved to be completely illusory, no educational system will be able to make people believe the contrary.

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