

In our Time Programme 36
Intelligence

Melvyn Bragg : Hello, today we're looking at a question, that in the words of one of our contributors has "stalked the 20th century" -intelligence. Since the first IQ tests were invented in 1905, the question of what make Homo Sapiens stupid and what makes him clever has often involved human kind in sterilisation, racism, hubris and misery. But are we any closer to understanding what this elusive quality of intelligence is?The debate still rages as to whether we're born with it or whether intelligence is something we develop as we grow, and evidence for both seems to pile up almost daily.

Joining me today is the educational psychologist, Dr Ken Richardson, until recently he was senior lecturer at the Open University, and is the author of "Understanding Intelligence" and "The Origins of Human Potential" and a new book called "The Making of Intelligence". I'm also joined by Professor Michael Rouse, of the the University of Gulf, Ontario. He's a philosopher of biology and the author of "Mystery of Mysteries:Is Evolution a Social Construction?".

Ken Richardson, how....briefly if that's possible, would you define intelligence?

Ken Richardson : I see intelligence as the mental abstraction of the complex informational structure in the spheres of our activity. Take driving for example, your decision to overtake the vehicle in front isn't simply based on the association with your speed of approach to it, you've got to make decisions based on whether or not there's traffic coming in the opposite direction and that depends on the length of the straight road ahead, of you, and if there is something, and if there is something coming you have to judge its speed and distance and also be aware of your own rate of acceleration and so on. So there's complex layers of information that have to be taken account of in making decisions of that kind, and in making that decision of course you're using the current information and attempting to match it against a mental representation or a kind of mental model built up from previous experience in that domain.

Melvyn Bragg : Why do you think this subject....you.....it's your phrase..... "stalked the 20th century", why do you think it has stalked the 20th century?

Ken Richardson : It's been a question of deep controversy, and issue of deep controversy, right from the beginning of the century, and especially from the the foundation of intelligence tests. The early IQ testers were using the tests to establish, if I can **quote** the founder of the Anglo-American Intelligence tests, Louis Terman (??) he said "we must preserve our state for a class of people worthy to possess it", that pretty much states what the intentions of his IQ tests were.

And it's that kind of implication of intelligence testing that 's reverberated down the century and we still hear them today.

Melvyn Bragg : Michael Rouse why do you think it's been such a controversial subject?

Michael Rouse : Well, has it been a controversial subject? It's certainly...at one level it has....

Melvyn Bragg : It's incredibly controversial just recently in America with book the bell curve for instance.

Michael Rouse : Well, sure, and so have many other things been controversial whether it be in politics or....

Melvyn Bragg : Yeah but we're talking about intelligence here.

Michael Rouse : ...or these sorts of things.

Melvyn Bragg : Yeah but we're talking about intelligence.

Michael Rouse : Yes I know that, but Ifirst of all I want to question whether it's always been that controversial. My suspicion is that a lot of people basically accept intelligence, accept intelligence testing, and are happy with it. . I'm wondering, Ken, whether somebody like you isn't...I won't say a "fringe" figure, but certainly

a minority figure, who is dissatisfied with it and trying to push the idea that we're all dissatisfied with it, or that this is a big thing which has been ongoing etc etc.

Ken Richardson : Well, I think the debate is pretty evenly split in terms of numbers and I don't think I'm that much of a fringe figure. As you know intelligence tests were used in the 11+ examinations in this country for many years, and then they were dropped and many people who've formerly been in favour of IQ tests have then turned against them.

Melvyn Bragg : Do you think that the intelligence tests, IQ tests which was first devised as we said in 1905, do you think they tell us, Michael, do you think they tell us something concrete about the individual who is tested?

Michael Rouse : Yes, my argument would be or my feeling is that they do. I really do think that humans are intelligent, but I expect to find variation in intelligence. Just as you find variation say in physical nature, in sports ability and all of these things, and Ken you surely know from a biological point of view that variation is the name of the game. So if intelligence didn't have variation, it would have to be a very strange biological phenomenon. So I expect to find variation. I think there are big difficulties as you point out in measuring it, but I'm not sure that there are insuperable difficulties.

Melvyn Bragg : But back to this measurement which hasn't quite been answered. What do you think IQ measures that's important to be measured? Could you define that for us?

Michael Rouse : I think IQ measures mathematical ability, linguistic ability, I mean depending on the particular test which is being offered and of course, these days there isn't necessarily just one test which is going to be offered. You're going to offer a battery of tests. What you're going to ferret out is maybe social abilities or things of this nature.

Melvyn Bragg : And these can all be tested?

Michael Rouse : I think they can yes. I mean for instance, last year I've got a son who is in Canada, he's in a French immersion programme. He's having a lot of trouble with reading, and so last year we had him tested by educational psychologists like you Ken, and now they didn't just give him...or the woman who administered it, didn't just give us one test. I mean what we did was...what she did was tested for his mathematical ability, she tested his linguistic ability, when it was clear that he was having reading problems, she invoked a different kind of mathematical test which was going to be non-verbal, and all of these things so I really don't see, I mean at one level what the problem is.

Melvyn Bragg : That's a fair point. If intelligence tests give as much as Michael as given an instance of in an anecdotal, but obviously accurate, and widespread, one imagines examples like that, if they're measuring those things, mathematical ability, linguistic ability, why do you seem to think they would be better without them?

Ken Richardson : Well the ...it's a question of what underlines the learning of the mathematical ability, linguistic ability or whatever, and this is where IQ testers themselves, very much disagree. I mean among most IQ testers its measuring some, in my view, rather mythical internal energy which they call "g" a kind of general psychological ability for, which they call "g", it's entirely hypothetical and even recent texts will tell you that they don't really know what it is. Now with IQ we get a number but we don't know what it actually signifies.

Michael Rouse : But are you denying that, for instance that some people are better at maths than others, have more innate ability at it than others?

Ken Richardson : Well whether or not they have more innate ability than others I don't know, because I don't know what you mean by that. I certainly agree that some are better developed mathematically than others, and some are better developed linguistically than others. But here your talking about special abilities, language abilities, you're not talking about intelligence, as it's normally conceived in the literature and in research. This thing this underlying entity or force, which is what most people understand as intelligence.

Melvyn Bragg : You go much further than this though don't you Ken? In your book "The Making of Intelligence"

you say that "IQ tests should be banned" Now that's a long way to go. Why do you suggest that?

Ken Richardson : Well they don't actually tell us anything , they don't actually add information to that which can be gleaned by say the average teacher. This has been shown in research. The average teacher when asked, can predict future school attainments of all their pupils far more accurately than an IQ test. Why don't we just ask teachers?

Melvyn Bragg : Michael Rouse, you call yourself a genetic determinist, so you see intelligence as an innate inherited characteristic do you?

Michael Rouse : Yes I think I do. Innate inherited characteristic, but of course don't forget innate always means innate as it develops in environment. I mean we're innately humans for instance, I mean we're innately of a certain size, but we all know perfectly well that if we're fed well when we're young we're going to be taller than otherwise. So I don't think anybody is going to be determinist in the sense of saying one gene, one characteristic or something like that.

Melvyn Bragg : But you do think intelligence is something we're born with?

Michael Rouse : Well yes but you see..... I've, but....

Melvyn Bragg : And the intelligence we have we are born with?

Michael Rouse : But you and Ken are trying to back me into a corner

Melvyn Bragg : No I'm asking perfectly ordinary questions

Michael Rouse :which I don't want to defend. No, no , you're trying to back me into a corner of saying "I believe that there is one thing like height or something like that, that you know we've either got or we've got on a certain scale". What I'm saying is I think there are certain abilities that we have, I think that we vary in our innate capacities to develop these, but of course the environment's going to be important as well.

Melvyn Bragg : But I'm just trying toI'm not trying to back anyone into a corner. I'm just trying to

Michael Rouse : Well you're doing a jolly good job with me!

Melvyn Bragg : ...understand it. Do you think intelligence in evolution has developed in human beings in the same way as say the eye has developed?

Michael Rouse : Absolutely, absolutely, of course it has, and as I said the thing I would want to stress is the social area. I think that intelligence has evolved in humans because we are a highly social species and highly social species need adaptations in order to get on as social species yes.

Melvyn Bragg : Over the last about 4 million years our brain size has tripled. Do you think that intelligence has driven that ...?

Michael Rouse : No I don't think intelligence has driven that, but I think that intelligence is an adaptation which we have developed, because...thanks to natural selection. There had to be some reason for intelligence because big brains are expensive adaptations , so that for instance in order to maintain a brain , you need a fairly rich protein diet for instance. So there had to be a good reason for it, and I think the way that we've developed socially is the key.

Melvyn Bragg : What about this.....what's your reaction to the idea that intelligence is innate? That we're born with intelligence? That it's an inherited characteristic and that it evolves the same way as the eye?

Ken Richardson : Well my position is that intelligence evolved to deal with highly changeable environmental circumstances, and this puts a different light on the notion of adaptation. By definition adaptation is adaptation to a fixed environmental structure, to something that's consistent and durable. Now when organisms started to evolve

into more complex environments they needed a completely new kind of regulatory system. One that furnished adaptability, not just adaptedness, and that intelligence takes off in evolution when, with the expansion, the gradual expansion through various levels of regulation of adaptability, this of course, reaches its highest point in human social interaction, which is constantly changing.

Consider for example two humans helping each other to carry a wardrobe downstairs something that no other species is capable of, which is commonplace in our species. The amount of data and the rate of change of input of that data is something that we require a particularly large brain to deal with. And social...special social regulations to deal with. So it's change and adaptability that intelligence is for, not fixed adaptedness.

Melvyn Bragg : Michael Rouse?

Michael Rouse : But do I disagree with this Ken? You see okay change and adaptability but you're conceding or you're allowing that humans have evolved with organs which enable them to be highly adaptable, to deal with changing situations, whether they're social or environmental or both. So why are you then starting to pull back and say " Yes but don't ask me to test this" or something like this. I say for instance that humans have clearly evolved to be bipedal to walk on two legs rather than four, I could surely test this if I'm an orthopaedic surgeon, or somebody interested in kinematics or something like this, but when it comes to intelligence you want to say "No, go no further this is not on", now why are you drawing say a distinction? I mean human walk on two legs, cats on four, that's a difference, that's innate. Some humans run faster than others, but when it comes to intelligence you want to pull back from testing, from measuring, and these things and I think what you're doing is for good social reasons, but I'm not sure that good social reasons are enough.

Ken Richardson : I don't pull back from measuring in principle, I simply stress that we need to know what we are measuring. Humans adapt to the world through cultural devices, and this is why we have managed to evolve historically, to change historically in the world so quickly, that when humans, as few as two humans interact together around a task, they're also creating a new kind of environment, a social environment, which needs to be regulated, and by a process of joint negotiation they develop rules, implicit rules negotiating together. We lift a rock, you take one side I'll take the other. Those kinds of what I call cultural tools or cultural devices have become far more complex of course in the course of human history, so that now, they include not just simple hardware tools, but also things like computers and also the rules of social life, and all the principles through which economic production is organised on a national and international system, all those things are cultural tools.

Now we're steeped in those cultural tools from birth, they become the vehicles of our cognitive expression, and dictate the very form of our knowledge and of our forms of thinking, now that's why intelligence is so difficult to measure, because it's not simply a question of trying to strip away the cultural clothing to get at the sort of naked intelligence underneath. The cultural clothing *is* the intelligence.

Melvyn Bragg : That still doesn't answer your question does it?

Michael Rouse : Yes, yes, yes well there's two things. I mean I agree that we're cultural, but I'm not so sure that we're that far from biology. I'm still obsessed with sex none stop, whether it's biology or culture or whatever. So I'm just not sure that I'm that different from an animal in that respect. But even if you give culture the high position that you want, I'm still not hearing from you arguments as to why it's impossible to try to measure not just necessarily one kind of intelligence, but intelligence generally. What it seems to me you're saying is "These are terribly difficult problems, so let's not do it".

Melvyn Bragg : And you fear that there is an ideology under this Michael, that people are afraid of where the evolutionary explanation for intelligence takes them, that it does, has taken some people into the area of saying that there are differences in intelligence between people of different coloured skin, between people who are culturally divided as we all know. In the 19th century, Herbert Spencer alone in arguing that colonialism was justified because the more intelligent people were taking over the less intelligent people, and that keeps recurring? Now in a sense does your view of innate intelligence, I mean part of evolution, does that lead to that?

Michael Rouse : I don't think it does at all. I was interested, when you introduced the programme intelligence was being presented as something which had caused all these problems or intelligence testing. Surely there's also the

flip-side to this, I think intelligence testing has been used for good in this century. I mean for instance in the 1950s when I went to school, I was given opportunities that my great grandfather and great, great grandfather were not given, who had to leave school at 14, who went straight into the regular army, who didn't go to grammar school, didn't go to University, and I, at one level, I'm very glad of intelligence tests. I think that it did cause social changes which were for the good.

Melvyn Bragg : But on the other side the fact is, that again and again and again this century, last century and previous centuries, whole people's were attacked and very often almost eliminated, because it was confidently thought and it was thought to be confidently provable, that they were of less intelligence, that has happened again and again.

Michael Rouse : Yes.

Melvyn Bragg : And it's still happening, I mean I'm not....

Michael Rouse : No , well it...

Melvyn Bragg : ...well it is, the book "The Bell Curve" by Marion Herstein which sold massively in America and caused a controversy here and everywhere, actually posited the idea that black people in America scored lower on IQ tests therefore they were of lower intelligence. So its very much in the air at the end of this century. We know from the battles that are going on in Europe, actually one of the battle cries is "These Albanians are of lower intelligence"

That is still a war cry, I mean it's part of what's going on. I don't think it need be necessarily at the heart of this discussion, but you brought it up and it is part of it. Ken Richardson what's your view of that?

Ken Richardson : Well, yes it's one of the reasons that the question of intelligence has "stalked the century". I mean it has had this effect on people, and is indeed one of the ways in which racism in this century became institutionalised.

Michael Rouse : But Ken that's just not true, racism was institutionalised long before this century came along.

Ken Richardson : I said *one* of the ways. I said *one* of the ways in which er...

Michael Rouse : Then people used intelligenceyeah well people used intelligence then to reconfirm their beliefs, their prejudices and these things, but the answer is not to say "Let's ban them", the answer is to say "Lets do it better to show that this is wrong". I mean in the 1930s the Nazis used genetics to "prove", you know I'm putting quotes around it now , to prove that Jews were genetically inferior. Now the way out of this was not to ban genetics, but was to do genetics properly , so that today, anybody who says that Jews are inferior because of their genes is not just morally wrong, they're scientifically ludicrous. Now what I'm saying to you is surely the answer is not to put your head in the sand and say "Ban intelligence tests etc etc". The answer is to say "Let's do it better ", "Let's show that the bell curve or these other things are just completely wrong, and that's what people have done.

Ken Richardson : What I'm saying Michael is not to ban measurement in principle, what I'm saying is to ban measurement when we don't know what the measurement is actually measuring. We still can't say when you get a score of 115, with one person, a score of 95 with another person, what the differences are actually differences in. I think that's where the priorities should lie, in actually elucidating the nature of the cognitive system.

Michael Rouse : But don't you think you're fighting yesterday's battles? You yourself have said "The 11+ has gone in the old form" and these things. If you were making this argument in the 1950s, I'd have a lot more sympathy for what you're saying. But as we go into the year 2000, its a lot more subtle than it used to be.

Ken Richardson : Well I'd agree that individual educational psychologists are rather more subtle than simply taking a bald.... administering a test, and then taking a bald score as the basis of their decision. But the point is that when they get that score they still don't know what it means. That's what I think is wrong and that's what I think leads to a lot of mischief. For example, one of the greatest puzzles to IQ testers at the present time, is why IQ scores have increased relentlessly over the last 20-30 years, in countries where IQ testing has gone on, in some cases

by as much as 15 percentage points. This shouldn't happen with an innate intelligence potential.

Michael Rouse : Why? Why? Why?

Ken Richardson : The answer is that intelligence tests are actually measures of social class affiliation, basically middle class social affiliation.

Michael Rouse : Now hang on a minute.....

Ken Richardson : And there's been a very large increase in the middle-class over the last 20-30 years.

Michael Rouse : No, hang on a minute.....

Melvyn Bragg : So more people are educated in such a way that it makes them better able to pass the tests? Like that remark by Boering that "intelligence tests, test people's ability to pass intelligence tests", and nothing else?

Ken Richardson : Well yes, people are moving into middle-class cultures. They're reading more. They're becoming more literate, and they're generally becoming.....

Melvyn Bragg : Let's go back to what you said much earlier. There are many, many different sorts of intelligence. You could get, if you played any games when you were young, you know the quite incredible speed of intelligence of some footballers or rugby players whichever you want to say, and yet whichever example you wish to choose, and the way they can pass, trap, direct the ball, which I think employs a massive intelligence, but perhaps ask questions about triangles and rectangles and so on, they wouldn't do particularly well.

So I think that in that sense, the intelligence that we've been talking about, have had, I agree with Ken here, have had a very specific brief, and I think they've had a specific purpose, it's mainly as Plato, from Plato, the idea was to cream off those who would be the rulers

Michael Rouse : Or to spot those who've got the potential to be the rulers. The point is....

Melvyn Bragg : Doesn't that itself....

Ken Richardson : That's the problem with it.

Michael Rouse : Well what is.....why is it a problem? I'd rather be ruled by somebody of intelligence than somebody who is stupid.

Ken Richardson : They are not stupid.

Melvyn Bragg : They are often nicer than intelligent people!

Michael Rouse : I don't necessarily want to be ruled by someone who's nice.

Melvyn Bragg : I do.

Michael Rouse : I want to be ruled by somebody.....

Ken Richardson : Neither does anyone, but you're mistaking, in suggesting that an intelligence test is actually identifying potential.

Melvyn Bragg : Can I just move it to a different direction here? Now Michael Rouse, do you think intelligence has a basis in human physicality? And if so, what are the most important factors? We heard recently Einstein's brain has occasioned some discussion because of its larger size unusual physical attributes that you'd know more about than me, which seem as it has been suggested, "look this shows that a person of enormous intelligence and the

particular intelligence of Einstein, was like this as he had a brain like this". Now is that just....? How did you receive that information?

Michael Rouse : I think that any biologist would expect that there's going to be some correlation somewhere somehow. But what the physical basis is, I think is an area that we're really now starting to open up, just as for instance the physical basis say, of things like sexuality and sexual orientation.

We're now starting to realise that the hypothalamus is very significant here, when it comes to say sexual orientation, and there really do seem to be differences between straights and gays and men and women over these things. But it's only in the last 20-30m years, even less than that, we're really starting to get a grasp on this, and so I don't think anybody.....

Melvyn Bragg : So you think.....

Michael Rouse : Go on.

Melvyn Bragg : You think that there will come a time when it will be possible to describe a part of the brain or the way the brain works and say "that part" or "that combination" equals intelligence?

Michael Rouse : I think it's certainly possible that will happen, whether that's the most profitable thing for us to do at this point, I question. Whether I want to put a lot of grant money into it I question. I certainly don't want to ban it like Ken does.

Ken Richardson : Wooooah, I don't want to ban anything scientific Michael, you keep insisting I'm trying to ban things, all I'm trying to ban is pseudo-science . Now there's a lot of delving about in the brain at the moment and there are claims about this or that region being associated with this or that deficit or enhancement in IQ. But basically there is very little understanding about what this huge brain of ours is for. I mean this huge cortex that we have, 85% of our brain, that's tripled in size over a very short period of time. In my view, it's there to support our social intelligence, and most of the brain functions necessary to do that arise in interactions between brain parts. You won't find intelligence in any particular part of the brain, I'm fairly sure about that.

Michael Rouse : The trouble is Ken every time I try to pin you down you start, you start to sound so reasonable! I mean you say you just want to ban pseudo-science, but what is pseudo-science? I mean evolution 200 years ago was pseudo-science, do you want to ban that? No , of course you don't. Do you want to ban work on intelligence? Apparently not. What you want to ban then, is things that...are people still using these things? Things that people used in the 1950s that by your own admission we moved on from, yet you want to ban them?

Ken Richardson : No, Melvyn quoted me as saying I wanted to ban IQ tests, that's what I want to ban, period, nothing else.

Melvyn Bragg : In your opinion Michael, can someone's intelligence as opposed to their knowledge, can it be increased in their lifetime?

Michael Rouse : Can it be increased in their lifetime? I don't see any reason why training and education and these things, after all I'm in education that's my job, I think that certainly one can increase the abilities, one can develop what I think is an innate capacity, but of course innate capacities are things that you're born with.

Melvyn Bragg : Ken what about you?

Ken Richardson : Well I questioned right at the beginning the notion of innate capacity. It's the notion that we have complex intellectual functions encoded in genes, I mean it just doesn't make sense. But that's a long story.

Intelligence, especially human intelligence is a developmental phenomenon par excellence , and yes of course it can be developed.

Melvyn Bragg : Given that it doesn't appear to be so important for our survival, do you think....or reproduction,

do you think intelligence has stopped evolving?

Michael Rouse : Well, I think intelligence is very important for survival and reproduction. It seems to me that intelligence is something that we're using all the time in our social interactions, in our relationships with our parents and with our spouses or our partners or whatever, so yes I certainly think it's very important. Is intelligence still evolving? Are humans still evolving? Well they are in some respects, but if you say, "Are we now subject to natural selection in such a way that it's really going on and making a lot of difference in this way?", I'm not sure. I suspect it is in certain parts of the world, where culture is a lot less effective. Whether it's still evolving in England or Canada I think is an open question. I suspect it might be.

Melvyn Bragg : Ken?

Michael Rouse : I'm doing pretty well I've got lots of kids!

Ken Richardson : Well our current species arrived on this Earth about 100,000 years ago. The spectacular change that's happened in the species and in the species abilities over that period of time has happened without any biological change whatsoever. I mean this is because human intelligence goes on at a completely different level, a socio-cultural level. We don't have for example the epigenetic biological regulations that give us wings, yet we can fly better than any birds. We have a very limited range of visions, sensitivities to a limited range of wavelengths, the same applies to our hearing, yet we can see and hear far beyond those biological constraints, because our intelligence goes on a different plane.

Melvyn Bragg : Thank you very much. Thank you Professor Mike Rouse and thank you Dr Ken Richardson, and thank you for listening. Next week we'll be talking about the continent of Africa at the end of the century with Henry Louis Gates and with Mandela's biographer Anthony Sampson.