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**'Who Counts?
An Examination of the Distribution of 'Intelligence' in our Society
and What Might Follow from That'** —

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The thrust of my paper can be described quickly. I believe that for the past century or so we have put too much weight on the importance of one kind of intellectual competence — what Howard Gardner (about whose work I shall have a lot to say) calls the 'logico-mathematical'. Indeed, for much of the past century we tended to define intelligence in terms of this competence, and to do so is still widespread today. Defining intellectual competence in that way has affected the curriculum and structure of our schools and universities and our system of rewards and honours and its gender bias, while it has reinforced our pattern of industry and occupation. While there have been understandable reasons why this has occurred, I believe that it has fundamentally anti-democratic and pernicious accompaniments, quite apart from its being unsound. It will also not be what our society needs in the coming century.

If the question is 'Who counts?' and the setting is the educational system, then the answer has been 'Those who do well in tests that favour a logico-mathematical competence'. The answer should have been 'Everybody', for it now seems to me almost beyond dispute that everyone has the gifts of 'intelligence'. What varies is the set of gifts, which are not only different from one person to another but differ in depth as well as in range. What is more, these gifts have a certain autonomy, so that having some kinds of intellectual competence does not automatically confer on one any or all of the others. Still more, properly motivated and properly prepared people can do well in almost any intellectual endeavour, especially if they are steered in the desired direction early enough.

For some present in the audience all this is old hat. For many people outside this audience, however, it is dangerous nonsense, soft stuff, idealist crap. The issue is a crucial one. If 'intelligence' — or perhaps 'high intelligence' — is a rare thing then it is important for human society to guard and nurture it. The belief that it is so underpins selective educational mechanisms, the celebration of the 'gifted' child, and intellectual elitism of all kinds. But if all humans have gifts of high intelligence, in some form or other, then the policy question is quite otherwise: how can we best ensure that all these gifts are identified and put to good use. For a long time we have gone down the first track. I suggest that it is time we explored the other.

I. SNAPSHOTS FROM A WORKING LIFE

This is an impossibly large subject for a presentation of this kind, and I ask for your indulgence if I skate too quickly over what may seem very thin ice. I would like to come at this issue first from some personal experiences that

cover the past half century. They led me to where I am today, and without them I would not have embarked on this project at all. Inevitably, I will spend more time on higher education than on primary or secondary education, and I am aware that much of the interesting work that is going on occurs in these domains.

1. 'Intelligence is what intelligence tests measure' (1948)

My father, a mathematics teacher, had faintly underlined this line in one of his books (*Intelligence*, by J. G. Ballard, I think). 'Why is that important?' I asked him. He looked at me in his serious way. 'Well,' he said, 'it can have two meanings. Whatever it is that these tests measure we call intelligence. Or they really do measure intelligence.'

'Oh,' I replied, missing the point and therefore becoming not one whit better informed. Dad always treated you like an adult, even though I would have been 11 or so at the time. But the conversation sticks in my memory because I'd just done such a test in 6th class, and that's probably why I'd been interested, looked at the book and raised the question.

2. Cuisenaire rods (1950s)

Dad was a great experimenter, trying out different teaching methods on his pupils and, later, when he was in charge of mathematics education at Armidale Teachers College, on whole classes and schools. One of his passions was Cuisenaire rods as a vehicle for improving the capacity of the very young to come to terms with number concepts. Before long he had his teacher proteges getting groups of five and six years olds, with the usual range of abilities, discovering for themselves advanced number relationships like squares and square roots. They did this through play and discovery, hardly at all through being directly taught. Some of the children moved very quickly, leaving their teachers far behind; but the whole group went a long way together. Since Dad loved talking about these successes I learned about them at the time, and thought them interesting, but no more than that.

4. Psych I (1954)

Lots of us did Psych I as undergraduates, and I'm glad that I was one of them. Much of it sticks in the memory, probably because it was like nothing that we had learned at school, and we learned about ourselves, and about sex, and measures of central tendency, and why some of us were big and bouncy and others thin and weedy, and about sex. We also learned about the IQ, and that only 2 per cent of the population were really bright. Fortunately, it seemed that we were part of that 2 per cent, which was quite gratifying. The truth was, or so it seemed, that Aldous Huxley (whose *Brave New World* I was then reading, probably in English I) was right, and there were a few bright Alphas and a lot of dumb Epsilons. It was good to be an Alpha.

5. External students (1955-60)

An early counter to this personally satisfying version of the distribution of intelligence was our academic competition with the unseen external students of our University, the University of New England, an early leader in the

provision of distance education. These students were mostly primary teachers, often in remote and difficult places. Nonetheless, they started to clean up the prizes, though on the face of it they couldn't be as bright as us — that is, they weren't traditional (school-leaving) university students. It seemed that determination and persistence were important variables, too. Perhaps they were at least as powerful as intelligence, or in some cases even more powerful.

6. Mature-age students (1971-79)

Ten years or so later, as a young professor at Macquarie University, I discovered that people who had left school, twenty years ago, at age 15 could, with the same kind of determination and persistence, do remarkably well at university. They often didn't write with fluency and grace, but their insight was sometimes miles ahead of the rest of the class — and, let it be said, of the professor too. What did they have that the young didn't have? Above all, they wanted to be at university, and they had placed it as the highest of their priorities in time and energy. Many of them had thought about the issues; often they had direct experience of them (I am speaking here of study in the social sciences). They probably had not studied philosophy or formal logic; but they were rigorous in argument. The issues were important to them, not just academic.

I heard Henry Rosovsky of Harvard at a seminar, and he said, among many other interesting things, that there were proportionately twice as many 'A' students at Harvard as there had been after the war. What was the cause: grade inflation or the uncovering of hidden talent?

7. ARGC applications (1981-87)

Ten years later still I am a member of one of the ARGC panels, each year reading hundreds of application for money which will enable academics to carry out the research that is dear to them. Some of what they want to do is fascinating stuff. I come to realise, from reading about linguistics and interviewing applicants, that virtually all human beings as children learn a language, construct its rules (they are often conscious grammarians and syntacticians) and display great prowess in their linguistic skill — all by the age of 10. They can learn several such languages at the same time, and other language-like skills such as music and mathematics. There is variation in their performance, but they are all obviously good at it. Is this capacity built in (today we would say 'hard-wired')? If it is, are other capacities similarly built in? What happens after childhood to affect the speed of knowledge acquisition elsewhere?

8. From elite to mass (1985-95)

From the middle of the 1980s I become progressively more involved in policy matters relating to research and higher education. I become aware that secondary and higher education are not what they were when I was young — the preserve of the middle class and a few strivers from the working class (like my parents) helped by mentors and circumstances. It now seems likely that secondary education will be universal, and higher education very widespread, and tending in the same direction. I chair an ASTEC working

party which produces in 1987 a report calling on the Minister of the day (Susan Ryan) to set a goal of 65 per cent completion of full secondary education. That target is easily passed before the end of the decade, when about a third of the school-leavers go straight on to university; about the same proportion go on to TAFE; others go one way or the other later on. By 1990 it is plain to me that the old models of the distribution of intelligence simply don't make sense. By 1998 DEETYA is prepared to predict that 90 per cent of all 18 year olds will undergo some kind of formal post-secondary education course at some point in their lives.

Why are there so many more Alphas than there ought to be? Why do we never seem to get to the bottom of the barrel? Why do many of my colleagues hang on to an old view of the distribution of intelligence?

I come to the intuition that almost our whole population is 'intelligent' enough to profit from serious post-secondary education — that, in principle, anyone who badly wanted to be a doctor would be 'bright' enough to do that successfully. It is not want of 'intelligence' that holds people back. I see more clearly that our educational system acts as a kind of sieve, distributing young people to occupations through their success in certain kinds of tests. But I now realise that these tests are not indicators of intelligence so much as of the outcomes of preparation, motivation and parental support. I no longer see myself as an Alpha, or an Epsilon. Rather, I am someone who had lots of parental support, was well taught at good schools, found what I was good at, and had the luck to hit the workforce at the time when my kind of talent was greatly in demand.

II. 'INTELLIGENCE' AND MULTIPLE INTELLIGENCES

Someone is bound to want to say that I didn't remember as much as I ought to have from Psych I, and they would be right. I remember the bit about high IQ partly because it was appealing, and partly because I was reading Aldous Huxley. A fuller account of the debate about intelligence, even in the 1950s, would have shown that there were at least two schools of thought. One school, whose intellectual founders were Charles Spearman and E. L. Thorndike, believed (to oversimplify) that intelligence was a single dimension, a central core, with some outlying options. Bright people were bright, but they could be bright in this way or that way; intelligence tests would sort them out, and the Stanford-Binet was the exemplar. The other school, to which Jean Piaget, Lewis Thurstone and of course Howard Gardner have contributed, thought the intellectual domain was much more complicated than this: there were separate kinds of intelligence, and no single core.

In the 1980s I had been searching for a satisfying account of the problem of too many Alphas for ten years or so, without really realising it. My problem was lack of time. From about 1985 I was spending virtually all my time on policy making and administration, and from 1988 I ceased to be a regular academic anyway. When I discovered Howard Gardner's work on the theory of multiple intelligences it was like encountering a book that one had read a long time ago and had forgotten. But no. It was first published in 1983, and I did not discover it for more than ten years after that, by which time it had been revised, rewritten and reissued. No matter, it was the book I

had been looking for, and those of you not familiar with it are going to learn why.

For Gardner, who seems to have been drawn to his work through encountering the same kinds of paradoxes I have described above, there are seven distinct 'intelligences'. For anyone interested in this field they are instantly recognisable from experience. Gardner gives them these names:

linguistic
musical
logico-mathematical
spatial
bodily-kinesthetic
intra-personal
inter-personal.

A few words are needed in explanation. Gardner is not especially happy with the use of the word 'intelligence', because of the baggage it carries; he would be just as happy with 'intellectual competence', and talks of the 'human intellectual repertoire'. Like him, I will use these terms more or less interchangeably. Linguistic intelligence is competence in language, both written and oral/aural; musical intelligence is obvious, and Mozart is its greatest exemplar. Logico-mathematical intelligence is what it sounds like, while spatial intelligence is the kind of competence possessed both by good engineers and by good sculptors. Bodily-kinesthetic competences are the kind demonstrated by ballet-dancers, painters, actors, acrobats and sports-people generally. The personal intelligences divide into two: an understanding of oneself, and a sensitivity to others. Gardner makes a strong case for the existence of these seven intelligences, and for their relative independence.

There are, of course, occupations which are built on high levels of performance in one of these domains. Yet I was more struck by Gardner's argument that the domains provide separate perspectives, or separate strengths, for occupations. Law and politics, to take two examples, can use them all, in different facets of those multi-dimensional occupations. The same can be said, surely, for the occupation of teaching, and indeed for the rest of the professions, a matter that I shall return to in the last part of this paper. I was also struck by the timeliness of certain competences. A favourite example of mine is Ken Rosewall's phenomenal bodily-kinesthetic intelligence as revealed in his backhand, a fine talent to have in the mid-20th century, but not much use a hundred years earlier, any more than D'Artagnan's skill with the sword, a much desired talent a couple of centuries earlier. The human intellectual repertoire is most varied, and responds to the demands of time and place. There is a degree of luck in being about at the right time, for individuals can be either beneficiaries or victims of a society's valuation of competences, a valuation which is never stable. (Gardner, p. 165)

Gardner's theory provided me with a plausible explanation for another paradox of life, familiar to everyone in this room. Why are bright people often so dumb? Why can some geniuses lack the skill to tie up shoelaces, why do we have 'absent-minded professors', why can my children and grandchildren program a VCR and make sense of a new computer so much

faster than I can? In my forty years in universities I have seen dozens of people appointed to professorships because of their standing in their discipline, the outcome of steady publication at a high level. Not a few of them had little competence in anything else, were unable to master a small budget, or lead their staff, or arouse the interest of a first-year class, or mount a persuasive case for more money, or even understand why they were not being as successful in any or all of these activities as they were in their research work. The plain truth is that high competence in one domain does not carry with it competence in all the others. My necessarily briefer experience in other walks of life suggests to me that universities are not alone in assuming that success in one activity carries with it the likelihood of success in others.

I do not wish to devote too much time to explaining, justifying or defending Gardner's position. His book, *Frames of Mind. The Theory of Multiple Intelligences*, does that well. But I should make clear that there are other varieties of the same perspective, notably that of Robert Sternberg, for whom there are distinct 'analytical', 'creative' and 'practical' intelligences (Sternberg, 1985). A recent book by Goleman, *Emotional Intelligence*, wants to add an eighth to Gardner's seven (Goleman, 1995), and there are of course many who fundamentally disagree, and want fewer. What I want to emphasise is the recognition by Gardner that human intellectual capacities are varied, and that to have one or two of them is not necessarily to have more, let alone all. Perhaps most important of all, there is not a single intellectual capacity, what we might call 'being bright', sitting over the rest of them.

Now I need to emphasise that Gardner is not saying that all people have intellectual gifts to the same kind of degree. There are certainly prodigies, both child and adult, and abundant natural talent in any of these seven domains is always easy to spot and enviable. But he insists that the competences given to us all are there to a high degree:

whatever differences may initially appear, early intervention and consistent training can play a decisive role in determining the individual's ultimate level of performance. (p. 316)

He puts the argument in the following way, and I think I was moving to the same point ten years ago, much less confidently, and without anything like his knowledge: *if* a particular intellectual skill is important to a society, and *if* sufficient resources are devoted to it, and *if* the individual is motivated, and *if* proper learning is available, then

nearly every normal individual can obtain impressive competence in an intellectual or symbolic domain. (ibid.)

Any teacher, I think, has come to some such realisation about a given student, no doubt without generalising matters to the whole society.

But I believe that we are entitled to do so. Gardner tells us (p. 234) of a tribe in Nigeria in which everyone is expected to dance and sing well, and to be able to carve. The tribe recognises that a very few individuals may have talents superior to their fellows, but nonetheless believe that everyone possesses the abilities to achieve something memorable in these areas. Or

look at the successes achieved by all very young performers using the Suzuki method in violin, noted also by Gardner. Or note the successes among adult people who want to paint or draw but feel that they have no talent. Note the extraordinary number of courses that are available to adults to train them in virtually everything; the assumption is that all people are trainable, in everything. Supply your own anecdotal example. The point is that an environment in which people are encouraged and high performance is expected is one in which you will get a lot of high performance, another truism familiar to this audience.

Those who feel that Gardner has missed the point, that what he calls the 'logico-mathematical' is simply what intelligence is all about, and that all the rest are something rather less (like 'useful skills') are invited to read the book. There will be a lot of such readers, because so much of our educational system is based on just such an assumption. It was accepted at my high school that 'bright' kids did maths and science, and a science teacher asked me point blank why I was wasting my time with languages. My father held no such assumption: he was delighted to have 'bright' kids in his maths classes, but his best stories were about the less bright, and how patience, persistence and motivation allowed them to score well, and sometimes surpass the 'bright'.

The Case of Science

The assumption that the logico-mathematical is the only, the best or the highest form of intelligence underpins the notion that 'science' is somehow the basis of modern Western society. It would be more accurate to say that our material civilisation is the outcome of a marriage over the past two centuries between economics, politics and technology, with none of these domains naturally dominant, but no-one much seems interested in knowing about this process in history. A few years ago there was a fuss in South Australia when it was noted that a very large proportion of those leaving school had performed well in maths and science in the exit examinations, but were not choosing to go on at university in these areas in anything like the same numbers. The reason, said the science lobby, was that salaries and conditions in science were not attractive, and there is no doubt something in that explanation. But the more important observation ought to have been, first, that success in the logico-mathematical domain had been used as a sieving mechanism to allocate students to faculties and, second, that because success in maths and science was being used as a means of entry to highly desired occupations such as law, the members of the cohort knuckled down and demonstrated that they could all do it well. Most did not want to go on to science, and probably never had any such intention. But they could achieve well enough in that domain if there were sufficient reason to do so.

Gardner himself notes that our society 'cares deeply about the logical, scientific and mathematical concerns ... even at the expense of the some more aesthetic or personal forms of intelligence'. (p. 164) A 19th century ranking of intellectual disciplines, in which mathematics and physics rule the roost over the other natural sciences, which are superior to the social sciences, with the humanities and theology coming last, is still very much part of the body of thought which governs policies about universities and, to a lesser extent, perhaps, schools. It is this foundation which allows prominent scientists to

make lofty pronouncements about the larger issues of life. Yet, if I may speak as someone trained in the scepticism of the social sciences, the logico-mathematical perspective is itself based on a system of beliefs. I have written about this myself, but Gardner is even tougher:

in the final analysis, science itself is virtually a religion, a set of beliefs that scientists embrace with a zealot's conviction. Scientists not only believe in their methods and themes from the depth of their being, but many are also convinced it is their mission to use these tools to explain as much of reality as falls within their power'. (p. 150)

For nearly twenty years now I have watched perfectly hard-headed politicians bow to a scientist's passionate belief in the power and virtue of science and of scientific research, when the most obvious data fail to support the argument. No matter; the politician is rarely trained in the natural sciences or in the kind of social science which raises questions about means and ends. And everyone 'knows' that scientists are the brightest of the bright. But Gardner would say, No — they simply have a highly developed logico-mathematical competence.

III. WHERE SHOULD WE GO FROM HERE?

If Gardner is right, and I strongly believe that he is, then success at school, and to a smaller degree in life, is a function of early encouragement and support from parents and sensitive teachers rather than of native 'intelligence'. More, it seems that one's intellectual gifts will appear at different times, and that the early ones will probably get early development, which will push the child in a given direction. It is quite likely that some of the intellectual dimensions will get little attention. How are parents to be advised? What of children who have uninterested parents? What would be good policy? I think that, at least for Australia, the whole debate is at too early a stage for finely detailed policies, for first we need a change of culture. Nonetheless, the Chairs of Academic Boards of the Universities of NSW and the ACT pointed out to the NSW Board of Secondary Studies that 'modern theories of intelligence and human development argue for a multi-faceted approach: it is important to recognise the diversity of human potential across a range of 'intelligences' or cognitive domains', and they referred in their advice to both Gardner and Sternberg. We are beginning to contemplate a major shift.

I offer five suggestions intended to speed the shift.

1. Spread the Word

The issue of the distribution of intelligence within the community is so important that it should be made the centre of the debate about the future of our country. I am aware that some schools have taken up Gardnerian principles; we need to know what the outcomes have been. We need to pursue the question in the usual ways, especially through research, and publicise the results.

2. Recognise the deep unfairness of the present system.

Australia's educational systems equate 'success' with 'ability', which is another code-word for 'intelligence'. Early success marks pupils out for attention, and is likely to be followed by further success, even though each new educational system provides a new set of hurdles. Gardner's message is straightforward: all children will benefit, in education as in everything else, from early training and consistent parental support. Those who receive it will perform better than others, not because they are inherently 'brighter', but because early development is powerful. Those who do not receive early training and consistent parental support run the great risk of being categorised in negative ways, not because they are inherently less bright, but because their particular competences will appear more slowly, and will receive much less attention over time. Since in all of this much depends on people's socio-economic location, our educational systems at all levels, in rewarding the products of early development, are providing unfair outcomes.

I ought to make clear that I start from the position that life chances are at birth distributed unequally and that, for this reason among others, it is the business of a democratic society to act in ways which help to equalise life chances. Our society needs a new approach to education, one which genuinely recognises that all children are intelligent, and that each of them has the capacity to do almost anything. Just to accept that proposition, and to follow it with building the appropriate degree of self-confidence would seem to me to be an enormous step forward for our society. It is probably worth making the point again that our system is based on an assumption that there is not much intelligence about, and that it should be identified and nurtured. The unfairness of our system could be defended if that were the case, on the sort of utilitarian principles that justify public expenditure on engineering and medical schools. If it is *not* the case, and I argue that it is not, then our current system, in the way in which public money is allocated, is not defensible.

I recognise also the fundamental importance in all of this of a supportive family environment for the child. I have no ready policies to assist in bringing about such a state of affairs. Here too we need a change of culture.

3. Consider the choices before us.

If all children have the capacity to do anything, given the requisite encouragement, persistence and training, what is it that they should developed to do? Since each will have a particular set of gifts in his or her competences, should that set be identified and given support, or should we ensure that every adult person has, for example, strong logico-mathematical or strong linguistic capacities? American schools which have adopted the Gardnerian approach label the gifts as 'math smart', 'people smart', 'body smart' and so on, which is a beginning, but what then? As everyone knows, to concentrate on the things one is good at can take all the time there is. There is no straightforward answer to this question, because one's answer depends to a large degree on one's values and sense of history. But I offer a personal perspective as the next suggestion.

4. Take some of the pressure off the logico-mathematical.

I believe that our society would greatly benefit from a re-assessment of the importance of the logico-mathematical competence. I recognise that the material basis of Western civilisation owes a lot to it, to our capacity to pursue an idea, a hypothesis in a single-minded way, to break down complex notions into smaller propositions, more easily dealt with, and thereby to solve the larger questions. Yet there is a cost for this process of discovery, and that is the lack of connectedness in our knowledge. This is properly the subject of another paper altogether, but I can at least point to the problem. It seems to me that economics has become both more powerful and less humanly useful to the extent that it has emphasised its logico-mathematical strand, its abstract purity, if you like, and downplayed its status as one of a number of interdependent social sciences, all of them concerned with how human societies can be improved. In Gardner's terms, we need in economics a marriage of the logico-mathematical with the inter-personal and the linguistic intelligences.

We need such a marriage also, and perhaps more urgently, in the natural sciences, where too many scientists wash their hands of the consequences for human good or ill of their discoveries. The approaching 21st century offers us nothing but challenge, and only human knowledge can provide solutions to over-population, environmental pressure and the explosive politics that will come, and in many respects are already here, as a result. But as always the trick is to mobilise the knowledge and to apply it; that requires at the very least a healthy dose of the inter-personal and linguistic intelligences on the part of those who do the intellectual work. Without it, we have only the rhetoric of 'pure research' and 'investigator-led discovery', the striving for Nobel prizes and the rest of conventional science.

5. Rethink the university.

I finish on what is almost a domestic note for a vice-chancellor. Gardner's work offers me a new perspective on the very old and always new institution that is a university. All of these intelligences are studied there, and practitioners of their pure forms — historians, linguists, dancers, mathematicians, scientists, musicians, engineers, actors, psychiatrists, psychologists, and the rest, are educated there.

But in the universities too the dominance of the logico-mathematical is very great. 'Research', the purest form of activity of logico-mathematical intelligence, is the canon by which everything is judged, whether it is appropriate to do so or not. Ten years ago, when I was the Chairman of the Australian Research Council, I was approached by the deans of performing arts faculties asking me to help them design a research paradigm that would enable them to be taken seriously in their universities. The absurdity of this proposal was clear to them, but the need to justify themselves was even stronger. Australia's universities, like those in much of the Western developed world, have never been less sure of their reason for being, and they seem incapable of explaining it to their societies. I believe that a way forward lies in recognising that it is 'creativity', not 'research', that lies at the heart of the endeavour, and that all the intelligences can be mobilised to develop creativity, in a way that brings all the intelligences to bear, to everyone's benefit.

In setting out to write this paper I was aware that the task was an enormous one, and in finishing it I am all too aware that there is much that I should have read before I wrote. I hope that those who can see that our society, as well as our educational systems, have suffered from too great an attention to one kind of intelligence, and from a false assumption that there is only one kind of intelligence, and that sparsely distributed, will forgive me for having written a paper which has many more questions than answers.

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