

Intelligence

Your Definitions

During class, you split into four groups and were able to come up with the following definitions.

	Gp 1	Gp 2	Gp 3	Gp 4
I	Can infer language even though it's not formally explained	Imitating, eg. children can imitate a parent who uses technology such as using a remote control	Recall 2x tables	Can understand perceptual information correctly - eg a small plane seen in the sky scales up to be much larger in reality.
II	Knowing the social laws very well (eg. Current PM abrogating the constitution in order to put reforms through)	innovation, such as Serevi's innovation in the double goose-step	Learn about consequences.	Ability to differentiate measures and quantities effectively.
III	The ability to imitate, eg. students that imitate teachers well.	Think, react, adapt FAST!	Adaptability - eg can construct replacement motorcycle parts out of non standard parts	Plan & organise a school bazaar where things often do not go according to plan.

I challenged many of you to defend your definition, which is not to say that it was wrong. For the most part you all came up with definitions that have indeed been used by various people. In the end, I did want to illustrate that defining intelligence is not straight forward.

Definitions from others

I'm presenting my simplified version of how I see intelligence in psychology. I'm not pretending that it's comprehensive, or even balanced. I will however try to point out where my bias(es) is/are and you have to probably take it from there as to accept or reject what I'm espousing.

Intelligence is such an everyday part of our lives that we actually find it difficult to remember that there was a time when it was an exotic concept that took hundreds of years to refine in Anglo-European contexts. Today across the rest of the globe, there are serious questions as to whether there is only one way to define 'intelligence. Here is the definition taken out from the Penguin Dictionary of Psychology (Reber, 1995).

Few concepts in psychology have received more devoted attention and few have resisted clarification so thoroughly. Despite many efforts over the years to develop some independent definitions of the term, its connotations have remained intimately intertwined with the techniques developed for its measurement.

And another lovely excerpt from the same definition

Spearman, the great psychometrician, despaired of the

Cross Cultural Perspective

Matsumoto (1996) relates how the Chinese concept of intelligence includes "imitation, effort, and social responsibility". He also writes (p.183) that a teacher was considered 'stupid' because she could not read footprints in the sand. Or allied forces who were surprised at how Fijian soldiers could spot camouflaged Japanese soldiers in the jungles of the Solomon Islands (because they had used inappropriate plants in their helmets for the location in which they were hidden, in this case forest floor plants were seen in the high canopy of the jungle. Previous students of my psychology classes have remarked that in many traditional Pacific societies, 'wisdom' or 'clever' people often are those that can remember and apply traditional protocol or custom. Cree Indians in northern Canada had phrases that equated with "competent" such as: understands new things, good sense of direction & accumulated knowledge. In contrast a phrase at the "incompetent" end of the scale is "lives like a white person" (Berry & Bennett, 1992) – gotta love that one!

The IQ Test: Psychologists Shamed

In my opinion, if there's one arena in which psychology and the psychologists of the time should be utterly ashamed of, it's in the field of intelligence. Most particularly in their lack of clarity to the public about what the consensus is on intelligence and where there are doubts as to what it is, or how to measure it. Instead psychology and the psychologists of the day (pretty well up till the 1970s) did an dreadful job of this with the confusion that policy makers both then and now get to 'enjoy'.

Even today, one has to search hard and wide to find clarity on the topic and the lay person, or even the psychologist who is exposed to a certain school of 'intelligence' can be easily swayed to accept that the theory of intelligence is uncontroversial and has been scientifically proven.

There's a sense of irony that in fact it seems that the most eloquent person to talk about 'intelligence' is not a psychologist at all but a palaeontologist called Stephen Jay Gould, in a book entitled 'The Mismeasure of Man'.

The cruellest irony is that the IQ test was originally developed by Frenchman Alfred Binet specifically for the French government to identify which students were 'at risk' because they were falling behind other students – specifically so that they could get remedial instruction. Today the IQ test tends to be a (very blunt in my humble opinion) instrument to sort children and students into different schools, colleges and universities. This is a very different rationale from what was originally intended.

whole notion and called intelligence '... a mere vocal sound, a word with so many meanings that finally it had none'.

And then the definition goes on for over five times the amount given above, with two cross references. Thereafter there are a further six major definitions with the word intelligence in them.

I think that probably one of the reasons for the controversy in 'intelligence' has to do with the 'nature/nurture' debate, particularly with reference to the idea that can 'intelligence' (whatever that means) be improved over time (because it is nurtured), or is it fixed (since nature has given any individual a fixed set of mental assets)?

This actually has far more repercussions than when I first thought of this debate as being a mere intellectual discussion.

- The professional field of educational for instance has a history of '*streaming*' students based on the idea that if a student does not show an aptitude for academic work, then it is a waste of resources to continue to try. These students are therefore sent to a different educational *stream* that concentrates on vocational skills (to become a carpenter, plumber or carver). In the worst case scenario (in the Pacific) children eventually stay at home, learning instead how to look after the plantation or help out in the village.
- Or how about being rejected into a country on the basis of your supposed intelligence – sad to say but this happened in the early part of the 20th century in the US.
- Or the (for some like me) worst case scenario of placing races on a hierarchy of intelligence. I did a book review of a book entitled *The Bell Curve: Intelligence and class structure in American Life*, in which my obvious disdain for such a practice is made apparent. It is not that I have anything *per se* against placing races on a hierarchy of 'intelligence', it's just that it can't be done (until 'intelligence' is properly defined) and the science which authors such as Herrnstein & Murray (1994) – **it is just plain wrong!**

The central problem is that actually defining 'intelligence' is far harder than it first appears, and hence Spearman's frustrated quote given earlier in this essay.

Psychometric Intelligence Theories

Psychometric theories of intelligence relies on giving out huge numbers of test items (aka 'questions' in questionnaires) to huge numbers of people. The scores are entered into a very complicated set of a mathematical procedure called *factor analysis*. In theory however, all that factor analysis does is to try and 'clump' the test items that appear to be measuring the same thing. So all the questions that might be 'mathematical' are probably going to score the same high or low level for each person. In other words if a person gets the answer right on a question which involves addition, we wouldn't be terribly surprised if the same person also got the answer right on a question that involved subtraction.

Factor analysis, in principle, figures out what the underlying common 'factors' are in a set of test data scores. Each factor is (ideally) completely independent from any other factor. In reality though the procedure is 'relaxed' in order to make better sense of the data. The main thing that I would like you to pick up from the use of factor analysis is that despite it looking incredibly 'mathematical' it nevertheless relies on subjective judgements by the person conducting the analysis. There's nothing wrong with doing this, however, for those of us that don't do these analyses, we tend to take it under advisement that the analyses are somehow 'correct' because of the large amounts of computations that are done. Hence:

- Spearman, originally found one factor which he called 'G'. If you were highly intelligent then you would be so in all aspects of life.
- Thurstone, found seven primary factors: verbal fluency; verbal comprehension; numeracy; perceptual speed; inductive reasoning; spatial visualisation.
- Cattell found that there were two basic types of 'G', there was fluid and crystallised versions, the first was used to solve novel problems and finding patterns in new data; the latter was being able to use pre-existing skills, knowledge and experience to think.
- Guilford, found 120 intelligences that mapped onto a 5x6x6 cubic matrix.

All using the same mathematical process! And if that wasn't enough, just because we find an underlying construct using a mathematical process – and even if the data agreed with what we saw in real life – that does not mean that it is an accurate reflection of reality.

For the most part educational practice has pretty much taken the psychometric view of intelligence as factual. It is only recently (as in some parts of Europe and the US starting in the 1960s), that started to question the relevance of this intelligence in education.

PASS

We spoke briefly about PASS in class which is an attempt in part to reconcile the considerable empirical data on general intelligence ("G") because 'G' tends to be made up of four competencies:

- Planning process
- Attention/arousal competencies
- Simultaneous processing competencies (attend to lots of stimuli), &
- Successive processing (make sense of the information in a coherent serialised sequences)

This theory attempts to retain the empirical data for 'G' for a 'normal' population but the competencies that make up 'G' might not all be present and therefore one might see difficulties in people who are considered to have learning disabilities, or have mental challenges and so on.

Triarchic Theory of Intelligence

Robert Sternberg, who comes from a more 'nurture' tradition of intelligence. He defines three arms of intelligence which need to normally work in concert to bring about 'success'. He (like Gardner) points to a definition of intelligence that suggests that it needs to be defined in context (time and place) and identifies someone as intelligent if they are able to be 'successful' in their cultural or societal context – however that is defined. Sometimes he refers to his intelligence theory as the 'Theory of Successful Intelligence'. The three components are:

- Analytical intelligence: traditional intelligence type questions that normally has only 'one' correct answer.
- Creative intelligence: the ability to combine and mix different information together in an appropriate way.
- Knowledge-acquisition components: both facts and figures, but also processes.

I personally haven't studied much of Sternberg's theories **NOT** because I'm unsympathetic, far from it, but because it seems that much of what he seems to be referring to is also covered under Howard Gardner's *Multiple Intelligence Theory* outlined below.

Emotional Intelligence

This is not an encompassing theory of the whole of intelligence, but rather a focus on a particular type of ability. This is the ability to both perceive and express emotions both in oneself and in others. Daniel Goleman who coined the term and made it famous, suggests that much of our success in life can be attributed to our 'emotional intelligence'. It shares attributes with the 'interpersonal intelligence' of Howard Gardner's *Multiple Intelligence Theory* outlined below.

Multiple Intelligence Theory

I think amongst other uses that we might have for such a term, one of the central ones would undoubtedly be along the lines of knowing that a person can do a particular job well? If I live in a nomadic tribe which has a leader/chief, who makes decisions as to where to camp, or where to move to find food, the best person to do such a job is the one that is 'intelligent' in being able to find safe camps and can 'intelligently' read the terrain and weather so as to know when to move on. If I want to employ someone to help programme complex calculations so that my multi-billion dollar space shuttle can safely take off and land having successfully completed a mission, then I want to employ an 'intelligent' mathematical computer programmer. For this reason over time I have started to employ a "trick" so that instead of using the word "intelligence", I substitute it for term "ability". In truth I don't really want someone who is in an abstract sense 'intelligent', I want someone who is 'able', for a particular task or a particular set of tasks. For the computer programmer, only the ability to programme computers might be important, it might not matter at all that the person has very poor social skills. For a President, I might want someone who has overall general skills but particularly the ability to listen to her or his advisors and people well (good interpersonal skills), so that they can use this information to make informed decisions. In other words, different tasks require different 'abilities'. And to try and loop this back to how this fits in with cross cultural issues, each cultural context will impact on what tasks are deemed important. Navigating through the Nullabor Desert (Australia) with no electricity or batteries doesn't require computer programming skills. But these skills are required in NASA control room. The picture that I hope I've drawn here is that we each have different abilities and different environments (different cultures) will promote, activate or reward them appropriately as being "intelligent" or not. If this is the case then the term 'intelligence' is fully expected to be different from one cultural context to another. Furthermore, it would not be possible to state that a single definition of 'intelligence' was any more correct than any other. If we use the word 'ability' then this becomes clearer to understand.

One of the psychologists that has gone on to talk about intelligences has been Howard Gardner (1983) who identified that in our present (western) society it was useful to talk about seven major forms of intelligence:

- **logical** (mathematics), – think Albert Einstein
- **language**, – think J.K. Rowling (Harry Potter books)
- **spatial awareness**, – think the artist Michelangelo (not the Teenage Mutant Ninja Turtle variety).
- **music**, – think Britney Spears (even if you don't like her music) or Michael Jackson.
- **interpersonal skills**, – people skills, think Richard Branson, billionaire who happens to be dyslexic
- **kinaesthetic** – body movement and body moving through space; think Waisale Serevi - acknowledged as probably the best rugby 7's player ever. Serevi pretty much invented the *goose step* which cost many an opposition team points on the score board.
- **intrapersonal skills** – knowing yourself; think Reinhold Messner, superb alpine climber, first to ascend Everest without oxygen. However, here is a man who definitely knows his own strengths AND weaknesses. Messner appears to suggest that one of his greatest

abilities is to know when you've reached your limits and must turn back, even if it means not climbing a peak on that particular time.

Notice that Gardner is stating that these intelligences are the ones that he's identified for a particular ethnic culture in a particular (modern) time. Previous generations or future ones may have a different set of 'intelligences' that could be or would be usefully identified - ability to work with computers might be one for the high tech. future (just a suggestion!).

One and One Half More Intelligences

Since he first proposed the theory he's added at least one other intelligence called '**naturalistic**' intelligence. This is the ability to see categories or divisions in nature. I tend to think of this intelligence as the ability to see practical patterns in anything and to see relationships between those patterns. So it could be the ability to see the different types of animal classes (eg edible vs. non-edible; dangerous vs. non-dangerous); but it could also mean the ability to see classes of transistor like elements in the design of an efficient micro-chip, or the ability to recognise working elements in a large factory to optimise efficiency. A prime example of naturalistic intelligence would be Charles Darwin

Gardner is also considering one other intelligence which he calls '**existential**' intelligence. This is the ability to see the big picture and ask the big questions such as 'why are we on this Earth?' and 'what is my purpose in life?' etc. Prime examples of people showing this intelligence would be Jesus Christ, The Prophet Mohammed, and Buddha. One of the criteria for considering a set of skills to be an intelligence is that it must have an identified part of the brain associated with it. None has been found (yet) for existential intelligence, hence it's often referred to as a 'half' intelligence.

Reference Sources:

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Glossary (terms you should know other than the theories)

factor analysis

psychometry

multiple intelligence