Why study intelligence?

Basic science	As psychological students, it is our duty to understand why people vary in this trait
Your life depends on it	Intelligence is a very important predictor of a number of important outcomes in life. By better understanding individual differences in intelligence, we can help build better societies.
Intell-igence is the solution to every single problem that is soluble.	Every problem that exists-and every problem that permits of a solution-can be solved provided we have sufficient intelligence.

History of Intelligence

Pioneered in 19th century by:	Alfred Binet (French)
	Binet developed the first test of intelligence in 1905=asked by the French government to develop a method to identify children in need of special ed.
	Collaborating with Theodore Simon, he created the Binet--Simon Scale = included 30 tasks of increasing difficulty. It was developed to be appropr-iate to the development of children aged 3-10.

History of Intelligence (cont)

	Francis Galton (English)
	Galton was interested in the hereditary nature of intelligence. He was also the first to propose-and test- that there were individual differences in intell-igence.
Stanfo-rd-Binet test	For US children.
	Used this test with represent-ative samples of children.
Standa-rdized testing	one child's score could be meaningful compared to others.
Intell-igence Quotient (IQ)	William Stern
	Stern noticed that the child's mental age (measured by the Binet-Simon scale) varied proportionally to their chrono-logical age.
	A 5 year old child with the mental age of 4 year old, will have mental age of an 8 year old when 10 years old.
	Stern developed formula for calculating IQ: (mental age/ chronological age) x 100
	The ratio one's mental age divided by their chronological age is their IQ
	This permitted a "normal" IQ to be 100

History of Intelligence (cont)

Raymond Cattel	Cattel accepted the validity of *g*, but suggested that *g* is compromised of two related but distinct forms of general intell-igence.
Crysta-lised and Fluid Intell-igence	Crystalised Intelligence (GC) reflects aquired knowledge and skills i.e. factual knowledge. Measured with tasks indicatin breadth and depth of the knowledge of the dominant cultue. Measures of compre-hension and vocabulary ability are indicators of crystalised intelligence. It is also expectedto increase over one's lifespan as as cumulative learning increases

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History of Intelligence (cont)

Fluid Intelligence (Gf)= represents reasoning that is independent of cultural influence/ It is the ability to arrive at understanding relations among stimuli, comprehend implications, and draw inferences. It measures of acquisition of new knowledge, patter recognition, and analogous reasoning and indicators of fluid intelligence. It is expected to be present at birth and be stable throughout adulthood.

How We Measure Intelligence?

There are three measures of intelligence that are predominately used in psychology.	The Stanford-Binet Test
	The Wechsler Test
	Raven's Progressive Matrices
The Stanford--Binet Test	Designed to be used with people ages 2-20+ years.
	Measures five Stratum II abilities: fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing, and working memory.
	Also measures General Intelligence (*g*)

How We Measure Intelligence? (cont)

Wechsler Tests	Wechsler Adult Intelligence Scale (WAIS)= 16-90
	Wechsler Intelligence Scale for Children (WISC) = 6-16
	WAIS-IV = is administered online or using a paper-and-pencil format. It includes 10 core subtests and 5 supplementaal tests. Takes 60-90mins to complete. WAIS-IV measures 4 strantum II dimensions of Intelligence: Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Speed. Also measures general intelligence (*g*)
	WISC can be administered digitally or usingpaper and pencil format. Takes approximately 60mins to complete. Five Stratum II dimensions are measured: Verbal Comprehension, Visual Spatial Reasoning, Fluid Reasoning, Working Memory and Processing Speed.
Raven's Progressive Matrices	First published in 1938
	Different to Wechsler's Tests but they too are designed to measure general intelligence.

How We Measure Intelligence? (cont)

John Raven believed that the best way to measure the abstract phenomenon of *g* was a scale free of all cultural influences, particularly language.

The Raven's matrices require non-verbal problem solving skills.

Test Includes 60 itens distributed across five sets of items

The items are ordered in increasing levels of difficulty

Can be used with child and adult samples.

Takes 40mins to complete.

What are These Tests Measuring?

General intelligence (*g*)	However, each tests measures no more than 3-5 of the broad domains of intelligence
	A thorough assessment of intelligence requires the administration of one or more additional intelligence tests measuring different abilities at Stratum II.

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What are These Tests Measuring? (cont)

Do IQ tests actually measure intelligence?	A consistent finding in criminal psychology is that lower levels of IQ are strongly associated with an increased risk of criminal behaviour. Most research suggests that low IQ is casual factor in criminal behaviour.

Causes of Individual Differences

What Causes variation in IQ	Genetics=overwhelming evidence that genetic factorsare important in expanding variation in IQ scores. Genetics become more important as people age. As people age they can shape their environment to greater degree- a person with an aptitude for mathematical reasoning might focuson math based subjects in school, study math based subjects in university, and go on to work as a computer engineer. Your environment becomes shaped by your underlying aptitudes which are themselves genetical influenced.
Environment	The American Psychological Association taskforce for intelligence highlighted four environmental factors for relevance:

Causes of Individual Differences (cont)

Biological Factors: Better nutrition leads to increased levels of IQ. Iodine supplementation in deficient areas leads to higher IQ. Supplementation with different vitamins, iron and magnesium increased children's fluid intelligence by 9 points (Bento and Roberts 1988). Exposure to lead in the environment has been shown to decrease IQ levels through childhood and adolescence.

School and Education: education and IQ are highly correlated, and there is longitudinal evidence that better education leads to increased levels for IQ.

The Flynn Effect

Discovery that mean IQ levels are increasing over time all over the world

Why us The Flynn Effect occurring?	Pieysching and Voracek (2015) have provided several suggestions
	Education=more years spent in education likely explains gains in crystallised intelligence (not fluid)
	Exposure to technology=more stimulating environments could explain gains in fluid intelligence

The Flynn Effect (cont)

Decreasing family sizes=rise of 1.4 points per decade can be attributed to smaller family sizes

Test Taking behaviour=increased frequently of test taking may improve performance on IQ tests.

Hybrid vigour=the mating of individuals from dissimilar subpopulations

Blood lead-level reductions=reduced amounts of lead in the environment could explain gains in IQ.

Genomic imprinting=environmental conditions affect reproduction information (i.e., male sperm) and ultimately genetic expressions in children and even in grandchildren.

Improved Nutrition=better nutrition can bolster IQ.

Reduced pathogen stress=increased hygiene leads to fewer infectious diseases in childhood. This means more bodily resources devoted to cognitive development.

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The Flynn Effect (cont)

Decreased IQ variability= reduced nr of people at the extremes of IQ (low end) would lead to increased mean IW levels.

Social multipliers=environmental gains lead to higher IQ and higher IQ leads to better environments which leads to higher IQ and so on.

Life History speed-'slow life history' individuals are typically characterized to have fewer lifetime sexual partners, fewer offspring and later parenthood, as compared with 'fast life history' individuals.

When pathogen stress is reduced and adequate nutrition is ensured, the development of slower life history speed is encouraged, thus allowing the emergence of differentiated cognitive abilities.

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