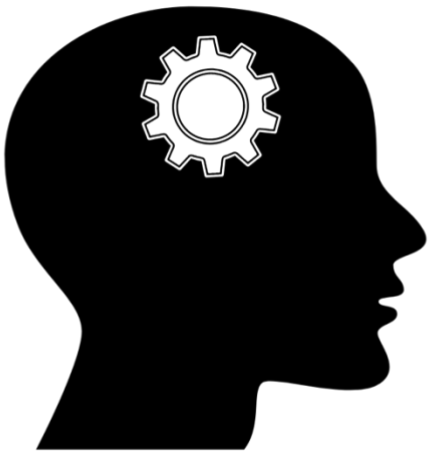
Department of Education

GOVERNMENT OF WESTERN AUSTRALIA

Year 11 ATAR Psychology

Cognition – Theories of Intelligence



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Year 11 SELF – Cognition
Theories of Intelligence

Instructions to Students

This resource package provides you with learning materials for the Psychology ATAR Year 11 course. The package focuses on the topic **Theories of Intelligence**.

This package is designed to support the program you are completing at your school. If feedback is required when completing this package, you should consult your teacher.

CONTENTS

Learning Content and Activities
This section is designed to develop the knowledge component of the syllabus. It also includes focus questions and activities to support your understanding. **2-11**

Additional Resources to support your learning **12-13**

Answers to activities **14-17**

It is recommended that you further investigate concepts covered in this resource package by conducting your own research using the text/s that you use at school or the internet.

Syllabus Points Covered

- *theories of intelligence*
  - *general intelligence – Galton, Spearman*
  - *measuring mental age and intelligence quotient – Binet and Simon, Terman*
  - *empirical approaches to intelligence – Wechsler*
  - *multiple intelligences – Gardner*
  - *emotional intelligence – Goleman*
- *intelligence testing*
  - *advantages and disadvantages of group and individual testing*

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Learning Content and Activities

WHAT IS INTELLIGENCE?

Intelligence is **not** a real thing. Its definition changes between contexts and cultures. Generally, it is accepted as **intelligence is what enables us to learn, adapt, perform, solve problems, understand and think abstractly**. We cannot directly observe intelligence. We can only infer it by the way people behave. This is the reason why much debate exists over what intelligence is and how to measure it.

THEORIES ON INTELLIGENCE

Spearman

Charles Spearman (1863-1945) noticed scores on almost all tests of cognitive abilities positively correlated. People, who do well on one, do well on others. He theorized that a general intelligence factor (g) underlies other, more specific aspects of intelligence

Galton

Sir Francis Galton (1822-1911) was the cousin of Charles Darwin. Galton's theory is that "genius" or "talent" is genetically rather than environmentally determined. He was one of the first to develop simple tests to measure intelligence.

In 1898, he travelled to Australia and measured vision, hearing and reaction time of Torres Strait Islanders to assess their intellect. He did similar tests on English "so called educated" people and recorded few differences between the groups.

Thurstone

Psychologist Louis L. Thurstone (1887-1955) offered a differing theory of intelligence. Instead of viewing intelligence as a single general ability, Thurstone's theory focused on 7 different "primary mental abilities." The abilities he described were:

- verbal comprehension
- reasoning
- perceptual speed
- numerical ability
- word fluency
- associative memory
- spatial visualisation.

Thurstone believed an average taken of the 7 primary abilities will give an intelligence score similar to Spearman's g factor.

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Gardner

One of the more recent ideas to emerge is **Howard Gardner's Theory of Multiple Intelligences**. Instead of focusing on the analysis of test scores, Gardner proposed that numerical expressions of human intelligence are not a full and accurate depiction of people's abilities. His theory describes **eight distinct intelligences** based on skills and abilities that are valued in different cultures. In his theory all people possess intelligence, with several intellectual potentials (intelligences), each of which involves a different set of skills.

The 8 intelligences Gardner described are:

- visual-spatial intelligence
- verbal-linguistic intelligence
- bodily-kinaesthetic intelligence
- logical-mathematical intelligence
- interpersonal intelligence
- musical intelligence
- intrapersonal intelligence
- naturalistic intelligence.

Sternberg

Sternberg is the author of a **Triarchic theory** of multiple intelligences consisting of three mental **abilities**. He disagrees with Gardner in calling these intelligences, instead believes these are talents or abilities. He said intelligence is a general quality. His theory stresses both the universal aspects of intelligent behaviour and the importance of adapting to a certain social and cultural climate. This is also called **Successful Intelligence.**

The three mental abilities are:

- **analytic** intelligence - mental processes used in learning how to solve problems
- **practical** intelligence - ability to adapt to the environment (street smarts)
- **creative** intelligence - ability to deal with novel situations by drawing on existing skills and knowledge.

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ACTIVITY ONE

1. Do you think that intelligence is learned or are you born with it? Explain your answer.

2. Galton's view of intelligence was influenced by Charles Darwin's theory of evolution. What did Galton believe that intelligence was?

3. Who was it who observed that scores on various tests were related to one another?

4. What is the statistical term that tells us about the relationship between two measures?

5. Use your psychological understanding of intelligence to explain Spearman's 'two factor theory'.

6. State the type of intelligence according to Gardner that matches the list of seven abilities below.

Intelligence	Description
	Ability to perform and compose music, to appreciate rhythm, tone and pitch
	Use of spoken and written language. Ability to learn language and to use language to obtain goals.
	Use of the body or its parts to solve problems. Coordination
	Ability to understand intentions, desires and thoughts of others
	Ability to analyse problems, solve problems and think scientifically
	Ability to understand yourself and your thoughts, feelings and intentions
	Ability to use large and small spaces, to form and use visual images of objects

INTELLIGENCE TESTING

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The first intelligence tests were devised by Francis Galton. In 1905, Binet and Simon developed a test to measure a child's mental age. Lewis Terman revised the Binet scale to produce the Stanford-Binet (introduced the idea of an IQ). Weschler (1939) published an improved measure for adults (introduced deviation IQ).

Binet-Simon Test
The test was developed in 1905 by Alfred Binet and Theodore Simon. The test was formed in order to measure intelligence of children in accordance with their age. The test was used on children from the ages of 3 years to 12 years.

Binet and Simon believed that children had a different form of intelligence than adults and therefore, they needed to be measured in a different way. With this scale they attempted to create a test which was standardised and would allow for the measurement of a child's intelligence in the present. The test gave children a mental age score (MA), which could be compared to other children. If their mental age score was more than two levels lower than their chronological age, then Binet suggested they should be separated for schooling from their peers.

Stanford-Simon Test
Binet-Simon Test was revised by **Lewis Terman** (1916) at Stanford and now commonly referred to as the Stanford-Binet scale. This was later refined refer by William Stern to calculate an intelligence quotient for IQ.

IQ is calculated by **dividing the mental age by chronological age and multiplying by 100**. The quotient meant that at any age, the average IQ score would be 100.

Whilst suitable for measuring the IQ of children, this test and scale is not suitable for adults.

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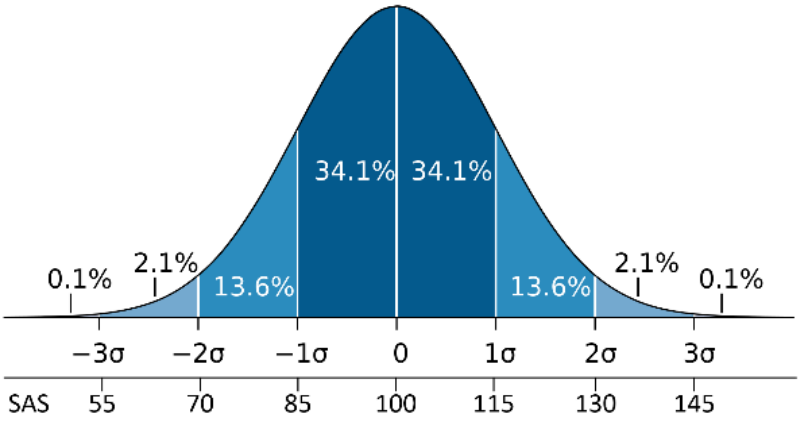
ACTIVITY TWO

1. Using the graph below, answer the following questions



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a) If Colleen has a mental age of 15 and is 15 years old, what is her IQ? How would you describe her IQ in relation to the normal student population?

b) If Fran is 10 years old and has a mental age of 14, what is her IQ? How would you describe her IQ in relation to the normal student population?

c) If Cathy is 17 years old and her mental age is 7, what is her IQ? How would you describe her IQ in relation to the normal student population?

d) If Chris is 6 years old and has a mental age of 5, what is his IQ? How would you describe his IQ in relation to the normal student population?

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Wechsler
David Wechsler (1896-1981) developed the empirical model of intelligence. Wechsler defines intelligence as the "capacity of an individual to act purposefully, think rationally and deal effectively with their environment". He developed a test to measure intelligence in **both adults and children**. He also standardised the test so that a norm score can be compared against.

Revised versions of the Wechsler tests are used in Australian schools. The WISC-IV is currently used. The tests are divided into sub-tests which, when the results are combined, gives an overall IQ score.

ACTIVITY THREE

1. Match the seven classification terms from the list with the correct IQ range by writing the classification in the correct box.

very superior *borderline* *high average* *average*
superior *low average* *extremely low*

Classification WISC-IV	IQ range	% of population	Percentile rank
	Over 130	2.2	98
	120-129	6.7	91
	110-119	16.1	75
	90-109	50	50
	80-89	16.1	25
	70-79	6.7	9
	Below 70	2.2	2

2. If a young person was diagnosed with an IQ score of 62, what do you think the young person would be able to learn to do? What support (teaching and learning adjustments) might they need in the classroom?

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IQ TESTS

Current tests still define the average IQ as 100, with 2/3s of the population falling between the cores of 85-115. People often talk about very high IQ scores, often referred to as genius IQ scores, but what exactly do these numbers mean?

- High IQ: Any score over **140**
- Genius IQ Score: **160 and up**
- Unmeasurable Genius - Scores that are **200 and over**

IQ Tests do a good job measuring:

- abstract thinking
- problem solving
- capacity to acquire knowledge.

IQ Tests however do not measure:

- creativity
- achievement motivation and goal-oriented behaviour
- ability to adapt to one's environment.

IQ tests have been criticised for having a cultural and socioeconomic bias.

IQ Testing

Pros	Cons
Reveals unknown talent	Self-fulfilling prophecy
Standardized method of comparing children	Measures only processes needed for successful test performance
Excellent predictors of academic performance	Biased against ethnic minorities (eg. Original Aus. IQ test)
Valuable for children with disabilities	Poor predictors of real-life situations
Predicts success in a wide variety of endeavors	Unconventional responses are penalized

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ACTIVITY FOUR

Go to http://advancedhr.com.au/licensedtoskill/how-do-you-score-on-the-original-australian-iq-test/ and take the Original Australian IQ Test. Click the link to score you answers. How well did you do? What is the problem here? Imagine the situation reversed for Aboriginal children taking a standard IQ test.

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INDIVIDUAL AND GROUP IQ TESTING

There are two major types of intelligence test, those administered to individuals and those administered to groups. These are **individual intelligence** tests which require one-on-one consultation with the child. The tests involve various verbal and non-verbal subtests which can be combined to give an overall IQ, but which also provide valuable separate subtest scores and measures based on the behavioural responses of the child to the test items. **Group-administered intelligence** tests involve a series of different problems and are generally used in mass testing situations such as the military and schools.

ACTIVITY FIVE

Complete the table below outlining the advantages and disadvantages of individual and group IQ testing.

	Advantages	Disadvantages
Individual Testing		
Group Testing		

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EMOTIONAL INTELLIGENCE (EQ)

Daniel Goleman, Peter Salovey, John D. Mayer, & others are involved in the emotional intelligence theory. **EQ** is the ability to perceive, express, understand, and regulate emotions. It is critical to social intelligence and appears to be unrelated to academic aptitude.

People high in emotional intelligence are more in touch with their feelings and the feelings of others.

There are 4 branches of EQ:

- perceiving emotions – first step in understanding is recognising emotions. Includes non-verbal, body language and facial cues.
- reasoning with emotions – using one's emotions to promote thinking
- understanding emotions – understanding that the emotions we perceive carry many different meanings. If someone is angry, then the cause and meaning of the anger needs to be interpreted.
- managing emotions – regulate and response effectively to emotions.

ACTIVITY SIX

Emotional Intelligence theorists have argued that some people are not able to succeed in work-related situation because they have a high IQ but low EQ. Why do you think this is possible?

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Additional Resources

Textbook references:

Nelson Psychology WA ATAR Unit 1&2

- read pages 40-48
- complete end of chapter questions on page 50 - MCQ 1-2,7 and SAQ 1-2

Nelson Psychology WA ATAR Unit 1&2 Student Workbook

- read and complete pages 58-65.

Additional reading and weblinks:

Check out the additional reading in the following links to help you clarify your understanding.

Crash course Psychology Controversy of Intelligence
https://www.youtube.com/embed/9xTz3QjcloI

What is Intelligence and Creativity
https://www.oercommons.org/courseware/module/15332/student/?task=2

None of the Above - Why Standardized Testing Fails: Bob Sternberg TEDxOStateU
https://www.youtube.com/watch?v=otlmKZeNi-U

Daniel Goleman Introduces Emotional Intelligence | Big Think
https://www.youtube.com/watch?v=Y7m9eNoB3NU

Using the template on the next page, construct a timeline of theorists who have contributed to the study of intelligence.

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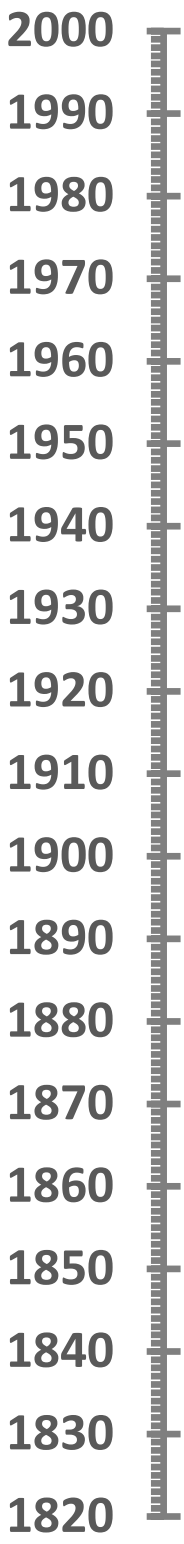
Major Contributors to the Study of Intelligence



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Answers

ACTIVITY ONE

1. Do you think that intelligence is learned or are you born with it? Explain your answer.
   Intelligence is partly genetically determined and is partly shaped by the environment and our learning experiences. People think that intelligence is what enables us to learn, to adapt to things around us, perform actions well, solve problems and think abstractly.

2. Galton's view of intelligence was influenced by Charles Darwin's theory of evolution. What did Galton believe that intelligence was?
   Galton believed intelligence was a general ability that showed itself in different ways, depending on the environment. He believed that it could be measured by simple tests

3. Who was it who observed that scores on various tests were related to one another?
   Spearman

4. What is the statistical term that tells us about the relationship between two measures?
   Correlation

5. Use your psychological understanding of intelligence to explain Spearman's 'two factor theory'.
   Spearman's two factor theory of intelligence – general intelligence g and a specific ability s. In general intelligence, if you do well on one test (memory test) you will do well on another (language test). Also each measurement included a factor that was specific to that test.

6. State the type of intelligence according to Gardner that matches the list of seven abilities below.

Intelligence	Description
Musical	Ability to perform and compose music, to appreciate rhythm, tone and pitch
Linguistic	Use of spoken and written language. Ability to learn language and to use language to obtain goals.
Bodily(kinaesthetic)	Use of the body or its parts to solve problems. Coordination
Interpersonal	Ability to understand intentions, desires and thoughts of others
Logical-mathematical	Ability to analyse problems, solve problems and think scientifically
Intrapersonal	Ability to understand yourself and your thoughts, feelings and intentions
Spatial	Ability to use large and small spaces, to form and use visual images of objects

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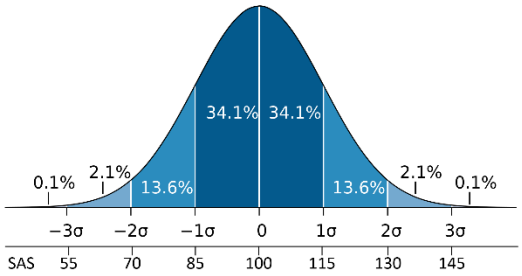
ACTIVITY TWO

Using the graph below, answer the following questions



"File:Wechsler.svg" is licensed under CC BY-SA 4.0

a) If Colleen has a mental age of 15 and is 15 years old, what is her IQ? How would you describe her IQ in relation to the normal student population?

Colleen's IQ is 100 and is normal-average for the normal student population for her age group

b) If Fran is 10 years old and has a mental age of 14, what is her IQ? How would you describe her IQ in relation to the normal student population?

Fran has an IQ of 140. She is in the top 2% of the normal student population for her age group and is a very intelligent girl!

c) If Cathy is 17 years old and her mental age is 7, what is her IQ? How would you describe her IQ in relation to the normal student population?

Cathy's IQ is 41. She is in the bottom 0.1% of the normal student population i.e. for her age group. She has a severe intellectual disability

d) If Chris is 6 years old and has a mental age of 5, what is his IQ? How would you describe his IQ in relation to the normal student population?

Chris has an IQ of 83 and is in the low average range of intellectual ability. There would be approximately 15% of students of his age group below him. He falls within one standard deviation below the mean for his age group.

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ACTIVITY THREE

1. Match the seven classification terms from the list with the correct IQ range by writing the classification in the correct box.
   very superior borderline high average average superior
   low average extremely low

Classification WISC-IV	IQ range	% of population	Percentile rank
Very superior	Over 130	2.2	98
superior	120-129	6.7	91
High average	110-119	16.1	75
average	90-109	50	50
Low average	80-89	16.1	25
borderline	70-79	6.7	9
extremely low	Below 70	2.2	2

2. If a young person was diagnosed with an IQ score of 62, what do you think the young person would be able to learn to do? What support (teaching and learning adjustments) might they need in the classroom?
   He/she will be able to spell, read (year 5 level) and write. They will require a lot more time to learn concepts, require direct instruction and rote repetition. Most tasks will need to be broken down into smaller parts. They can learn social skills and are able to relate and communicate with their peers. They are capable of having a job in a well structured environment.

ACTIVITY FOUR

Go to http://advancedhr.com.au/licensedtoskill/how-do-you-score-on-the-original-australian-iq-test/ and take the Original Australian IQ Test. Click the link to score you answers. How well did you do? What is the problem here? Imagine the situation reversed for Aboriginal children taking a standard IQ test.

The test is cultural biased against non-Aboriginal groups. It is impossible to do without knowing the cultural rules.

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ACTIVITY FIVE

Complete the table below outlining the advantages and disadvantages of individual and group IQ testing.

	Advantages	Disadvantages
Individual Testing	• Examiner can pay more attention to the examinee. • Examiner can easily encourage the examinee and observe his behaviour during the test more closely. • Scores on individual tests are not as dependent on reading ability as scores in group tests.	• It is very time consuming • This type of tests requires a highly-trained examiner. • It costs more than the group test.
Group Testing	• can be administered to very large numbers simultaneously • simplified examiner role • scoring typically more objective • large, representative samples often used leading to better established norms	• scores on the group test are generally dependent on the reading ability. • information obtained by the group test generally less accurate than the individual tests • examiner has less opportunity to establish rapport, obtain cooperation, and maintain interest • not readily detected if examinee tired, anxious, unwell • evidence that emotionally disturbed children do better on individual than group tests • examinee's responses more restricted

ACTIVITY SIX

Emotional Intelligence theorists have argued that some people are not able to succeed in work-related situation because they have a high IQ but low EQ. Why do you think this is possible?

High IQ they are "smart" or academically talented but low EQ means they would struggle in social situations. Work environments often involve dealing with other people and is one is poor at that then they will not be successful no matter how "smart" they are.

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