

PERSONALITY AND INDIVIDUAL DIFFERENCES

INTELLIGENCE /
EMOTIONAL INTELLIGENCE

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LECTURE OUTLINE

- Definitions of intelligence
- Major approaches:
 - Psychometric
 - Cognitive processes
- Define Emotional Intelligence (EI/EQ)
- Main theoretical models of EI
- Measurement of IQ and EQ

INTELLIGENCE

Definitions of intelligence
are hotly contested –
many different theories
of intelligence



The capacity to learn
from experience and
adapt to one's
environment

THEORIES OF INTELLIGENCE



Psychometric Approach

Underlies most definitions of intelligence

‘Mapping’ the structure of intellect

Identifying mental competencies that underlie test performance

Analysis of scores on intelligence tests



Cognitive Processes (or Information Processing) Approach

Focus on specific thought processes underlying mental competencies

‘Intelligence’: the steps or processes involved in solving problems

PSYCHOMETRIC APPROACH



GENERAL INTELLIGENCE

Spearman's General Intelligence (g)

1900's

Binet and Simon
First intelligence test
with school children

Questions asked
appeared dissimilar,
but argued that all
assessed basic
abilities to
understand, reason,
and make
judgements

Spearman (1923)
believed that there
must be a single
underlying construct

General Intelligence
Factor (g)



GENERAL INTELLIGENCE

Widely accepted that intellectual performance is determined partly by a general intelligence factor; the 'g' factor

'g' constitutes core intelligence

Noted as important predictor of both academic and job performance



Also determined partly by whatever special abilities might be required to perform a particular task

PRIMARY MENTAL ABILITIES

Thurstone's Primary Mental Abilities (1938)

- Challenged Spearman's 'g' factor – not outright rejection, but intelligence = both general and specific ability
 - Only moderate correlations between different mental tasks
- Proposed that human mental performance depends on seven distinct – **primary** – mental abilities

PRIMARY MENTAL ABILITIES

Thurstone's Primary Mental Abilities (1938)

Thurstone's Primary Mental Abilities	
Ability name	Description
M – Memory	Memorisation
N – Numerical ability	Dealing with numbers
P – Perceptual speed	Recognising visual patterns
R – Reasoning	Dealing with novel problems
S – Spatial	Reasoning about visual scenes
V – Verbal Comprehension	Understanding verbal statements
W – Word fluency	Producing verbal statements

FLUID / CRYSTALLISED INTELLIGENCE

Cattell (1963)

General intelligence consists of **fluid** and **crystallised** intelligence

Fluid intelligence:

- Comprehension, reasoning, problem solving

Crystallised intelligence:

- Recalling stored knowledge and past experiences

FLUID INTELLIGENCE

Cattell (1963)

Involves deductive reasoning

Requires ability to reason abstractly, think logically, and manage information within working memory

Correlated with comprehension and learning



Fluid intelligence declines as people enter later adulthood



Solving puzzles,
seeing patterns in
statistical data,
engaging in
philosophical
reasoning
(Unsworth et al.,
2014).

FLUID INTELLIGENCE

Cattell (1963)

- Horn (1969) – Fluid intelligence is formless; relies minimally on prior learning
 - Includes both formal and informal education
- Fluid intelligence peaks during late 20's before gradually declining (Cacioppo & Freberg, 2012)
 - Deteriorating neurological function? Or less use as we age?

CRYSTALLISED INTELLIGENCE

Cattell (1963)

Applying previously acquired knowledge to current problems

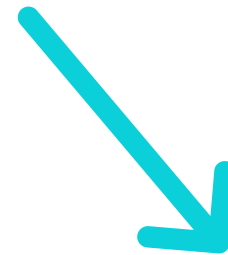
Based on ability to retrieve previously learned information from long-term memory



Recalling events and dates, remembering geographical locations, reciting texts (Horn, 1968)



Crystallised intelligence rises gradually and remains stable throughout adulthood until it begins to decline after age 60 (Cavanaugh & Blanchard-Fields, 2006)



CRYSTALLISED INTELLIGENCE

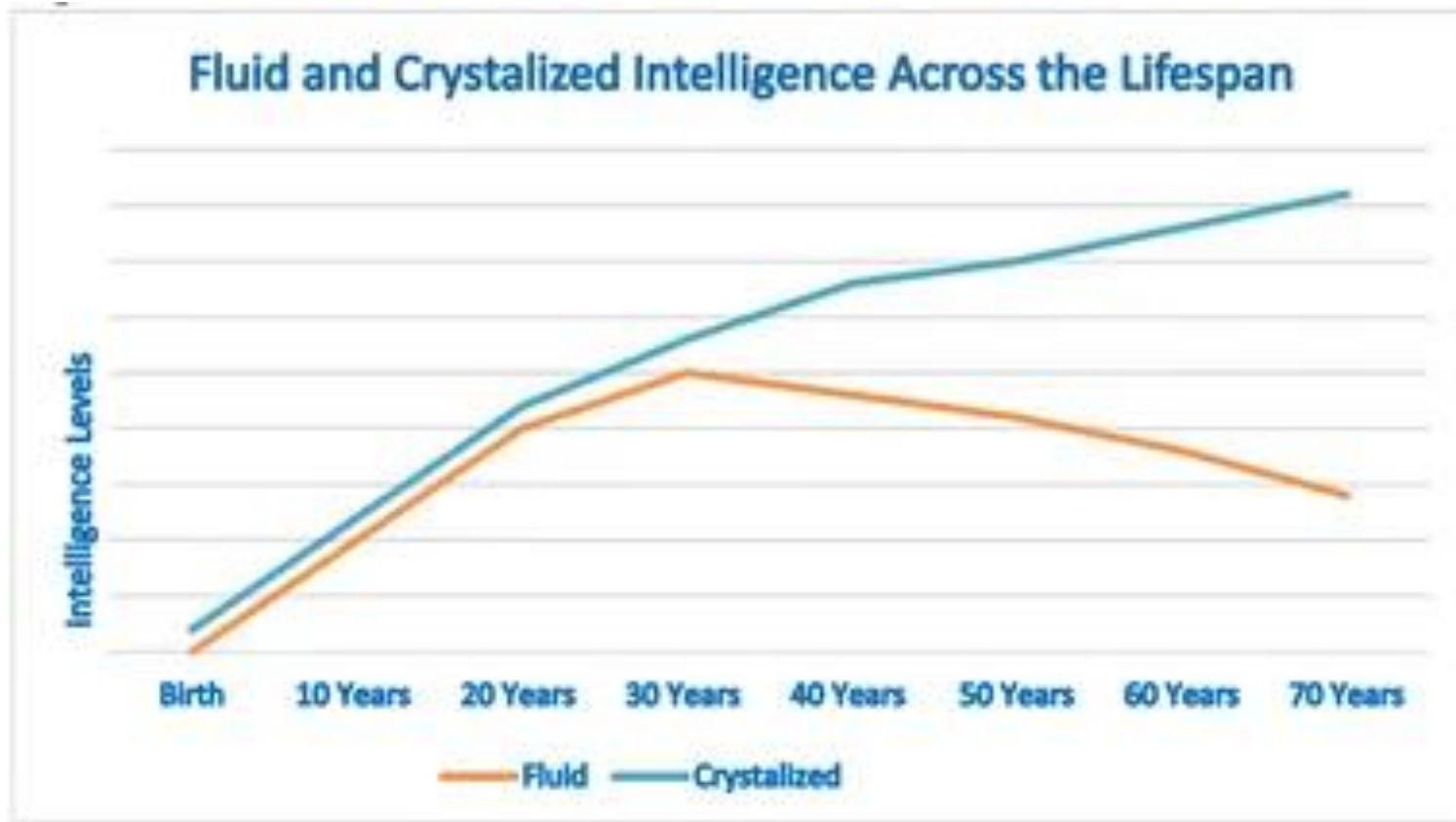
Cattell (1963)

- Horn (1969) – Crystallised intelligence results from accumulated knowledge of reasoning, language abilities and understanding technology, etc.
- Linked to education and experience; can be measured by tests of general information

FLUID AND CRYSTALLISED INTELLIGENCE

- Not entirely distinct entities
 - Both required to work together
 - E.g., situation that requires utilising fluid intelligence to construct a strategy and using crystallised intelligence to recall previous situations
- Crystallised intelligence is **not** fluid intelligence that has crystallised over time

PSYCHOMETRIC APPROACH



General
intelligence
(g)

Fluid
intelligence -
solving new
problems

Crystallised
intelligence -
use of
existing
knowledge

PSYCHOMETRIC APPROACH

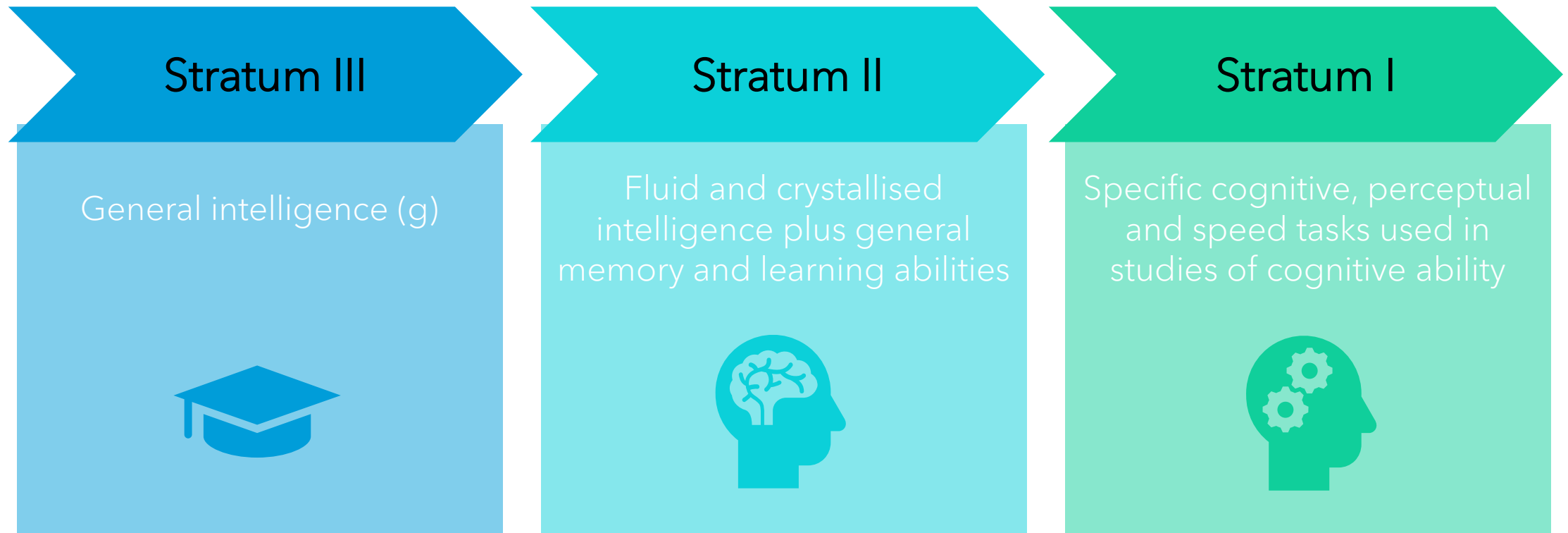
- Psychometric approaches are statistically sophisticated ways of:
 - Providing a map of the mind
 - Allowing for measurement of intelligence
 - Describing how people are different from one another
- *But they do not explain why people vary in these mental skills*

PSYCHOMETRIC APPROACH: INTEGRATIVE MODEL

Carroll's Three Stratum Model (1993)

- Integrative model of intelligence – contains elements of Spearman's, Thurstones and Cattell-Horn's models
- Hierarchical model - three levels of mental skill: general, broad and narrow
 - Carroll – model encompasses almost all known cognitive abilities

CARROLL'S THREE STRATUM MODEL (1993)



COGNITIVE/ INFORMATION PROCESSING APPROACH



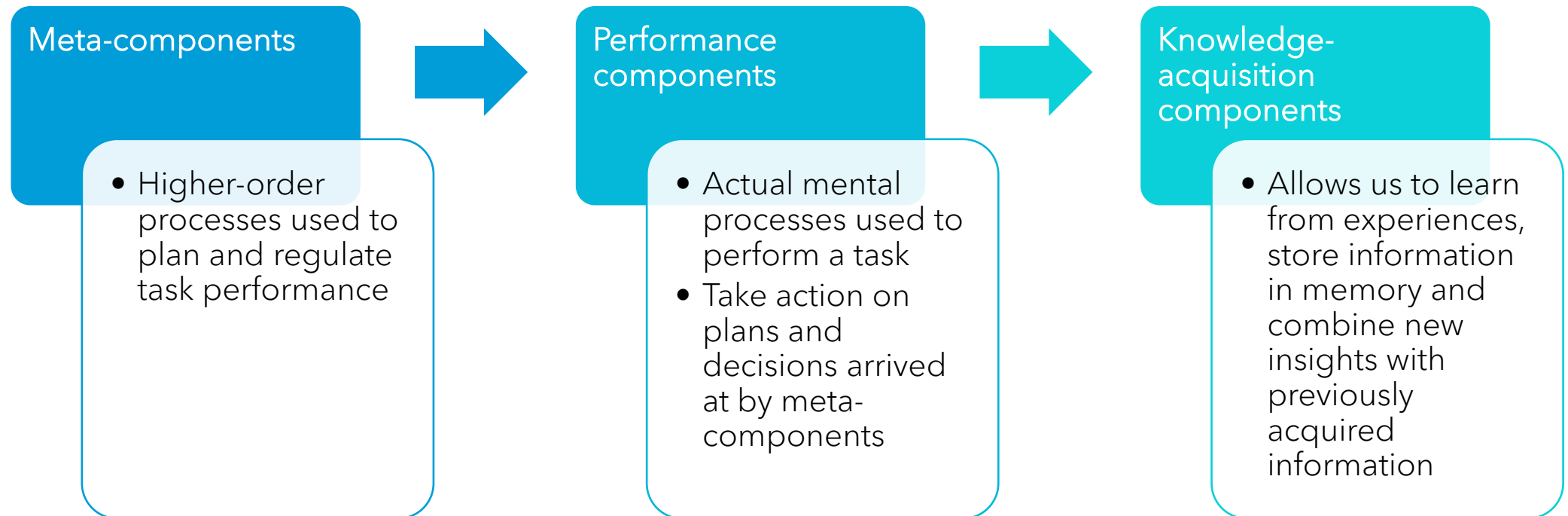
COGNITIVE APPROACH

- Explores specific information processing and cognitive processes that underlie intellectual ability
- Sternberg's Triarchic Theory of Intelligence
 - Based on the idea that there are multiple intelligences
 - 'g' only assesses academic intelligence
 - Addresses both the psychological processes involved in intelligent behaviour and the diverse forms that intelligence can take

COGNITIVE APPROACH

Sternberg's Triarchic Theory of Intelligence

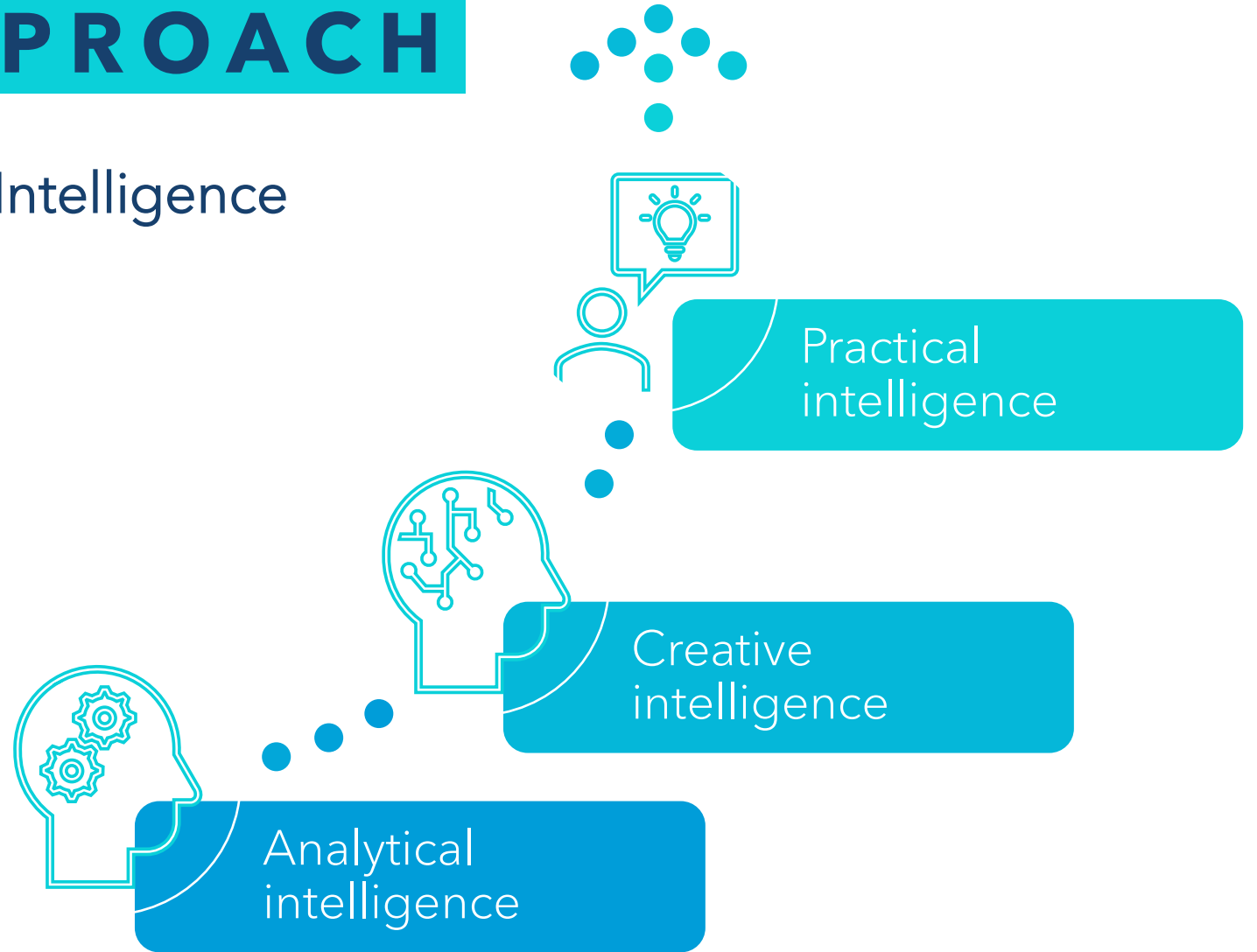
Divides cognitive processes into three specific components:



COGNITIVE APPROACH

Sternberg's Triarchic Theory of Intelligence

Three kinds of intelligence:



COGNITIVE APPROACH

Gardner's Theory of Multiple Intelligences

INTELLIGENCE	DESCRIPTION
Linguistic	Ability to speak and write well
Logico-mathematical	Ability to use logic and mathematical skills to solve problems
Spatial	Ability to think and reason about objects in 3D
Musical	Ability to perform and enjoy music
Kinaesthetic (body)	Ability to move the body in sports, dance, or other physical activities
Interpersonal	Ability to understand and interact effectively with others
Intrapersonal	Ability to have insight into the self
Naturalistic	Ability to recognise, identify, and understand animals, plants and other living things

COGNITIVE APPROACH

Gardner's Theory of Multiple Intelligences

- Evidence for multiple intelligences comes from savant syndrome
 - **Savant syndrome:** individuals who appear intellectually deficient (based on traditional definitions/measurement of intelligence), but display exceptional abilities in a specific area (or areas)

MEASURING INTELLIGENCE



MEASURING INTELLIGENCE



Goal of most
intelligence tests is
to measure *g*.



Intelligence tests
must have good
**psychometric
properties**



Psychometric =
measure of the
mind



Psychometric
properties =
reliability, validity,
and
standardisation
(and norming)

MEASURING INTELLIGENCE

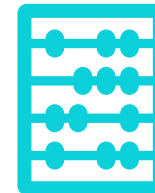
A good psychometric test must have three fundamental properties:



Psychometric
Reliability



Psychometric
Validity



The Practice of
Norming -
Standardisation

MEASURING INTELLIGENCE

Reliability

- Good intelligence tests are reliable
 - *They are consistent over time*
- *While a person's score may vary slightly with age and environmental condition, intelligence tests are repeatable and will generally be consistent from one time point to another*

Validity

- Good intelligence tests are valid
 - *They measure what they say they are measuring*
- An IQ test has construct validity if it demonstrates an association between test scores and the prediction of a theoretical trait
 - *Accurately measuring intelligence rather than another characteristic, such as memory or education level*

MEASURING INTELLIGENCE

- Standardisation – giving a test to many people at different ages and computing the average score on the test at each age level
 - Can then compare against norms
- Intelligence changes with age
- Regular standardisation of intelligence tests is essential
 - Flynn Effect (1999): scores on intelligence tests worldwide have increased substantially
 - Roughly 3 IQ points every ten years...

MEASURING INTELLIGENCE

- Binet – developed intelligence testing (work with SEN children)
- Intelligence established by assessing a person's mental abilities and comparing them with the abilities of other people (numerical comparison)
- Stern (1912): formula of Intelligence Quotient (IQ)
 - Based on an operational definition of intelligence – measure of intelligence adjusted for age

$$\text{IQ} = \frac{\text{mental age}}{\text{chronological age}} \times 100$$

MEASURING INTELLIGENCE

Wechsler Adult Intelligence Scale (WAIS tests)

- Wechsler Adult Intelligence Scale (Watkins et al., 1995)
 - Most recent WAIS-IV (2008) standardised on 2,200 people (16-90)
 - WAIS-V testing ongoing (release prediction 2024)
- Battery of sub-tests focusing on four specific domains of intelligence (index):

Verbal
Comprehension

Perceptual
Reasoning

Working
Memory

Processing
Speed

MEASURING INTELLIGENCE

Wechsler Adult Intelligence Scale (WAIS tests)

- Appropriate for people aged 16 to 90

Scores:

- Full Scale IQ (FSIQ), based on total combined performance of **all** indexes
- Four primary index scales:
 - Verbal Comprehension Index, Perceptual Reasoning Index, Working Memory Index, and Processing Speed Index
- Reliability scores consistently high (FSIQ and four primary index scales)

MEASURING INTELLIGENCE

Other Wechsler Measures

- Wechsler Primary and Preschool Scale of Intelligence (WPPSI-III)
 - Suitable for assessing IQ in preschool children
- Wechsler Intelligence Scale for Children (WISC-IV).
 - Suitable for assessing IQ in older children and adolescents

MEASURING INTELLIGENCE

Stanford Binet Test

- Stanford-Binet Test measures intelligence through **five** factors of cognitive ability and generates a single (combined) score indicating IQ.
 - Fluid reasoning
 - Knowledge
 - Quantitative reasoning
 - Visual-spatial processing
 - Working memory
 - Both verbal and non-verbal responses are measured

MEASURING INTELLIGENCE

Achievement and Aptitude Testing



Aptitude tests

- Measure ability to perform a task or ability to learn a skill/subject
- Assesses potential for future learning
- E.g., education, undergraduate, post-graduate, etc

Achievement tests

- Assess knowledge in certain academic areas
- Based upon mastery of content
- Focus on previous learning

IMPORTANCE OF IQ SCORES

- Challenged in recent years
 - Abilities tested by IQ tests bear little relation to real-life success
 - 'Misses the point' in conceptualising cognitive abilities

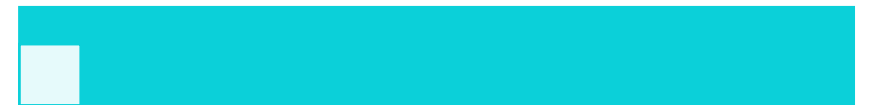
Cool



- ☐ Abilities involving perceptual processing and logical reasoning

- Alternative / novel abilities considered:
 - E.g., social, practical and emotional intelligence
 - Encompass abilities that involve emotionally-salient information
 - 'cool' and 'hot' intelligences

Hot



- ☐ Abilities involving emotionally-salient information

EMOTIONAL INTELLIGENCE



EMOTIONAL INTELLIGENCE

- Major psychological construct from the early 1990's
- Different and distinct from 'general intelligence'; EI is non-cognitive
- Relates to emotional salience / social intelligence
 - *Thorndike*
- Hot intelligence

EMOTIONAL INTELLIGENCE

- Emotional intelligence can be defined as the ability to understand our own emotions and those of the people around us
- Originally coined by Salovey and Mayer (1990)
- Daniel Goleman's book *Emotional Intelligence* popularised EI
 - “a way to understand why people act and behave in the way that they do in life and work”

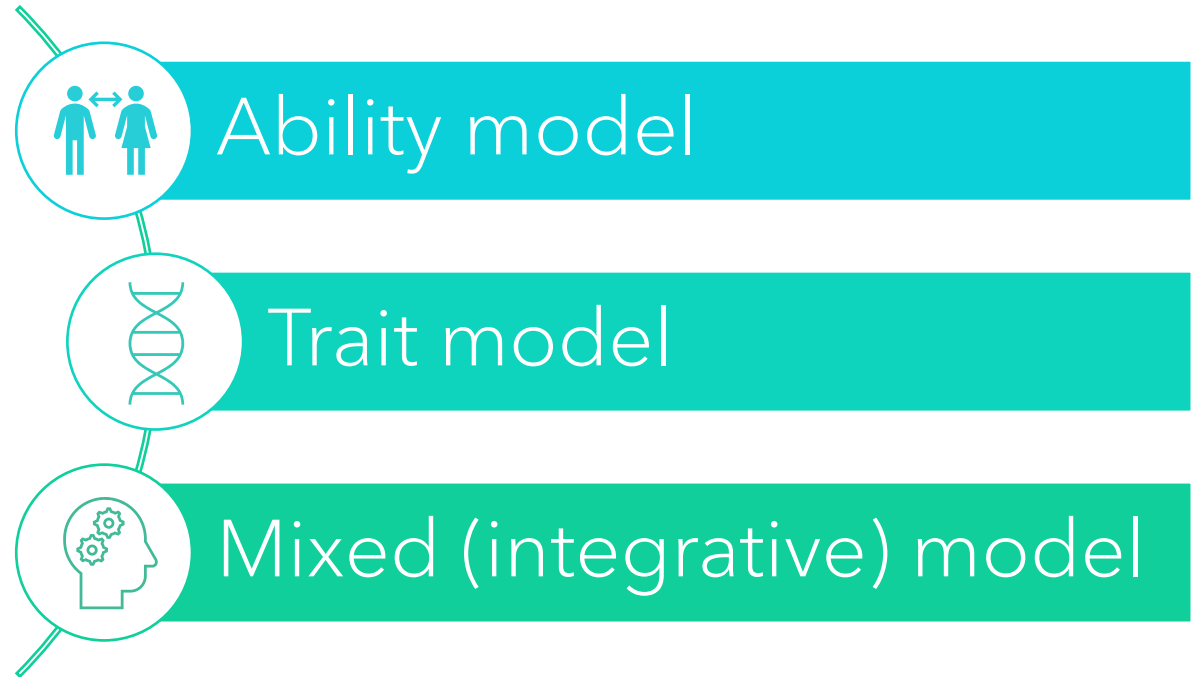
EMOTIONAL INTELLIGENCE

- Goleman (1995) - There are four components of EI
 - *Self-awareness*
 - Recognise our own emotional state
 - *Self-management*
 - Regulate own emotions
 - *Empathy*
 - Understand other's emotional states
 - *Relationship management*
 - Using EI to collaborate and manage conflict

EMOTIONAL INTELLIGENCE

- Emotional intelligence is, therefore, a type of specific intelligence
- Use of emotions and knowledge about emotions to consider problems
 - Mayer et al. (2008)

Three theoretical approaches



EMOTIONAL INTELLIGENCE

- EI includes “abilities such as being able to motivate oneself & persist in the face of frustrations; to control impulse & delay gratification; to regulate one’s moods and keep distress from swamping the ability to think; to empathize & to hope”



TASK

1

Ability model (Salovey & Mayer)

2

Trait model (Petrides)

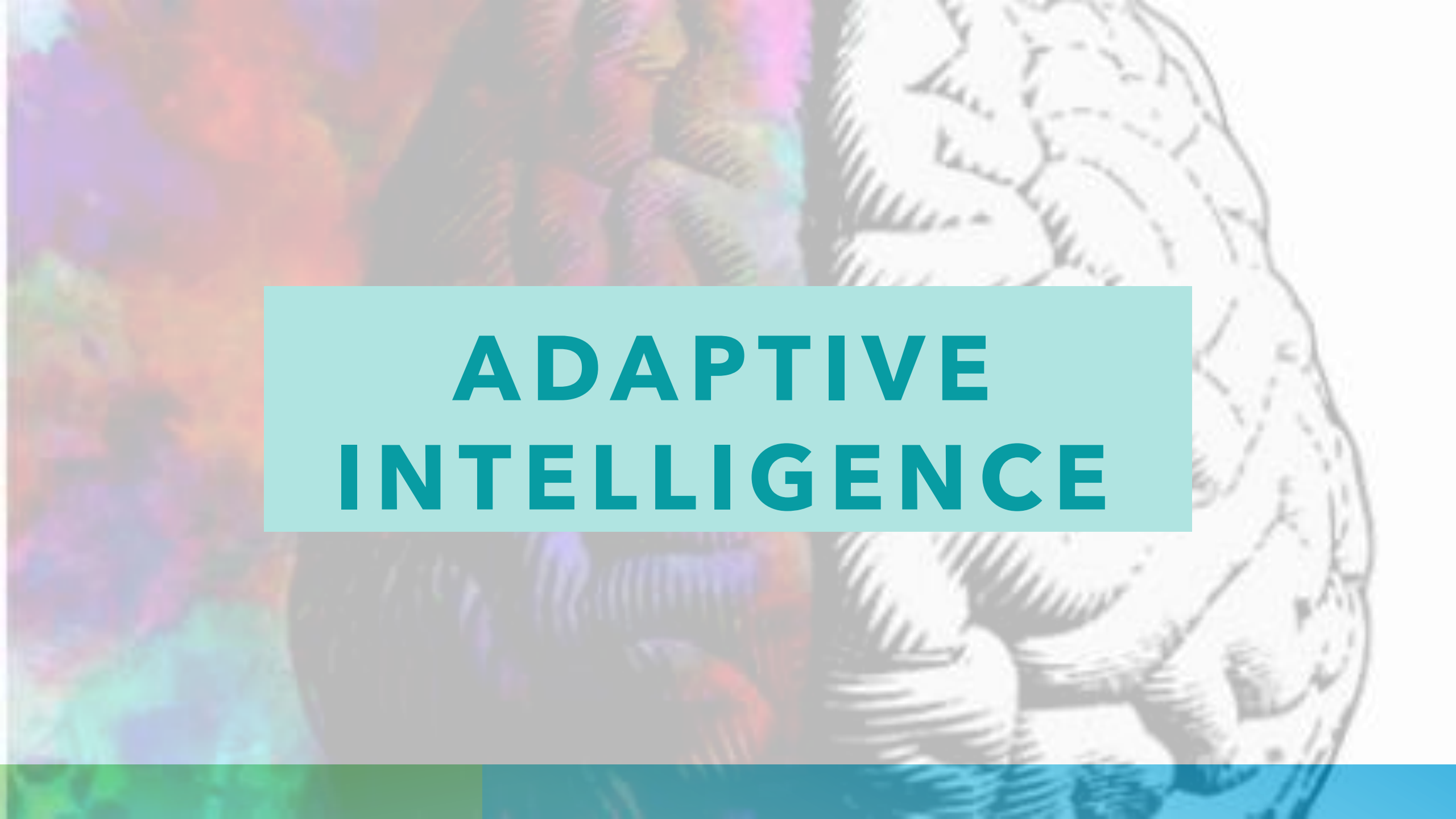
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Mixed (integrative) model
(Bar-On / Goleman)

EXPLANATION OF MODEL

MEASURING EQ

CRITIQUE OF MODEL



ADAPTIVE INTELLIGENCE