

INTRODUCTION TO PSYCHOLOGY

Lecture Four:

Individual Differences – Intelligence and Personality

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Lecture 3

- Definitions of intelligence
- Measuring intelligence
- What is personality?
- Trait theory
- The Five Factor model of personality
- Foundations of intelligence and personality

Theories of Intelligence: two major approaches

1) 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

2) Cognitive processes (or information processing) approach

- Focus on specific thought processes underlying mental competencies
- 'Intelligence': the steps or processes involved in solving problems

(Fishbein, 2984)

The Psychometric Approach

Spearman's (1923) two-factor theory

- Intellectual performance is determined partly by a general intelligence factor; the '**g**' *factor*
 - 'g' constitutes the core of intelligence
 - Important predictor of both academic and job performance
- Also determined partly by whatever special abilities might be required to perform a particular task

The Psychometric Approach

Thurstone's primary mental abilities

- Challenged Spearman's 'g' factor: due to only moderate correlations between different mental tasks
- Proposed that human mental performance depends on seven distinct abilities - primary mental abilities

Thurstone's Primary Mental Abilities (Thurstone, 1938)	
Ability name	Description
S – Space	Reasoning about visual scenes
V – Verbal Comprehension	Understanding verbal statements
W – Word Fluency	Producing verbal statements
N – Number Facility	Dealing with numbers
P – Perceptual Speed	Recognising visual patterns
M – Rote Memory	Memorisation
R – Reasoning	Dealing with novel problems

The Psychometric Approach: Crystallized and Fluid intelligence

Crystallized Intelligence: the ability to apply previously acquired knowledge to current problems

- Examples: vocabulary tests, information tests
- Based on the ability to retrieve previously learned information from long-term memory
- Performance on crystallized intelligence tests tends to improve during adulthood and remains stable into late adulthood

The Psychometric Approach: Crystallized and Fluid intelligence

Fluid intelligence: ability to deal with novel problem-solving situations for which personal experience does not provide a solution

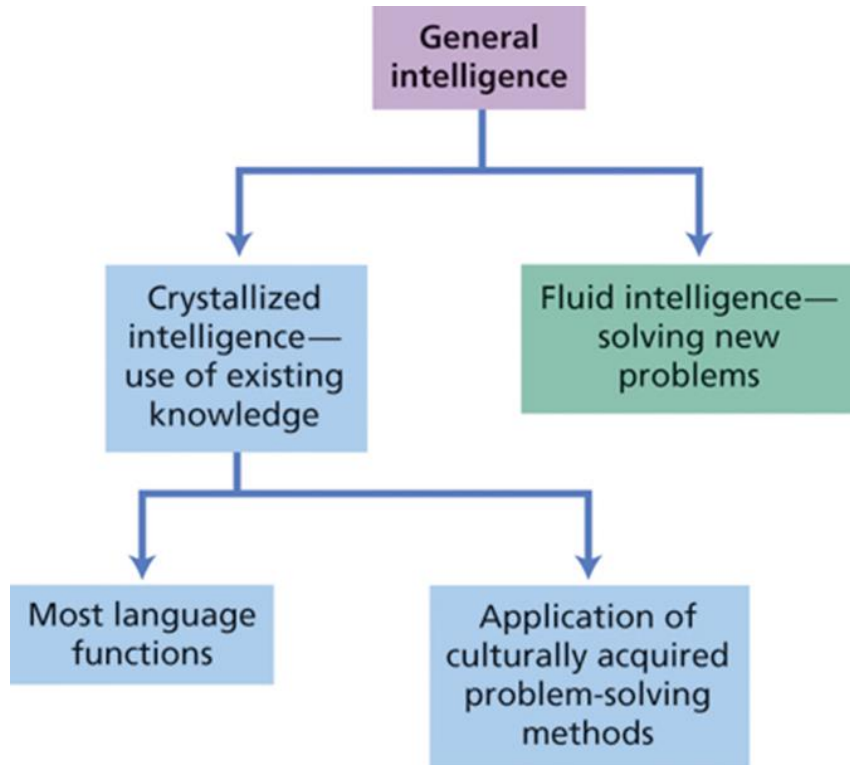
e.g. Tower of Hanoi

<https://youtu.be/JvQtzzgL5Kg>



- Involves inductive reasoning and creativity
- Required the abilities to reason abstractly, think logically, and manage information in working memory
- Performance on fluid intelligence tests begins to declines as people enter late adulthood

The Psychometric Approach



(Cattell and Horn, 1971; 1985)

- Psychometric approaches are statistically sophisticated ways of:
 - providing a **map** of the mind
 - describing **how** people are different from one another
- But they do not explain **why** people vary in these mental skills

The Psychometric Approach

Carroll's (1993) Three stratum model

- 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
- Stratum III - General Intelligence (g factor)
- Stratum II – Fluid and crystallised intelligence, general memory and learning, broad visual perception, broad retrieval ability, broad cognitive speediness, processing speed (reaction/decision speed)
- Stratum I – Specific cognitive, perceptual and speed tasks used in studies of cognitive ability
- Carroll – model encompasses almost all known cognitive abilities

The Cognitive Processes / Information Processing Approach

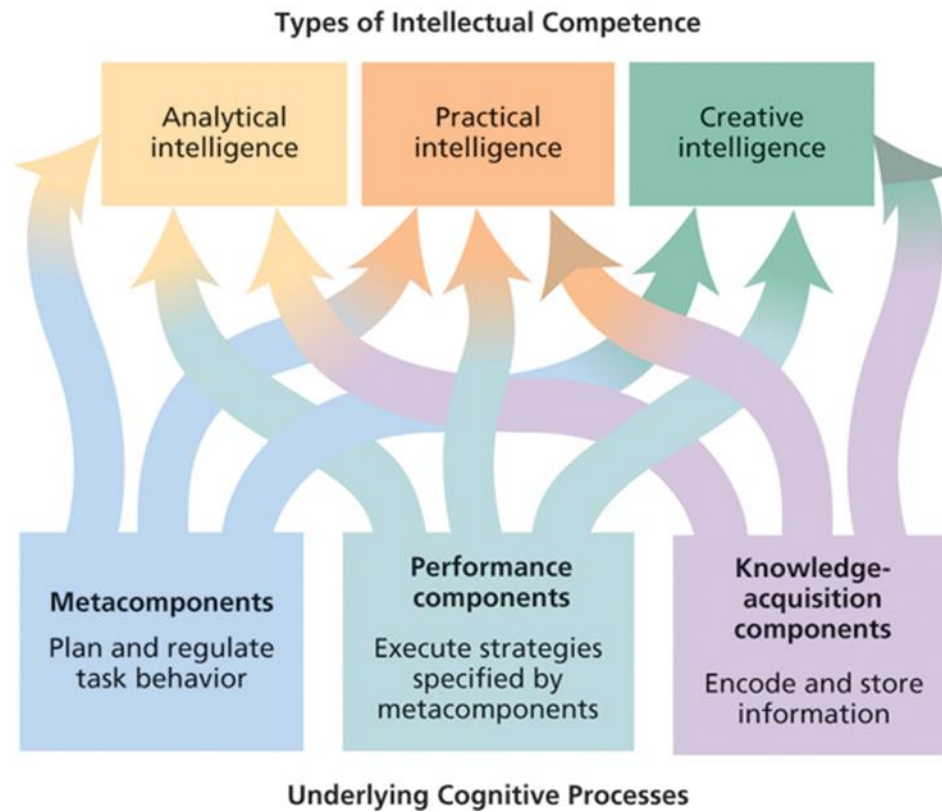
Explores specific information-processing and cognitive processes that underlie intellectual ability

Sternberg's Triarchic Theory of Intelligence

- Addresses both the psychological processes involved in intelligent behaviour and the diverse forms that intelligence can take
- Divides cognitive processes into three specific components:

Metacomponents	Performance components	Knowledge-acquisition components
The higher-order processes used to plan and regulate task performance	The actual mental processes used to perform the task	Allow us to learn from our experiences, store information in memory and combine new insights with previously acquired information

The Cognitive Processes / Information Processing Approach



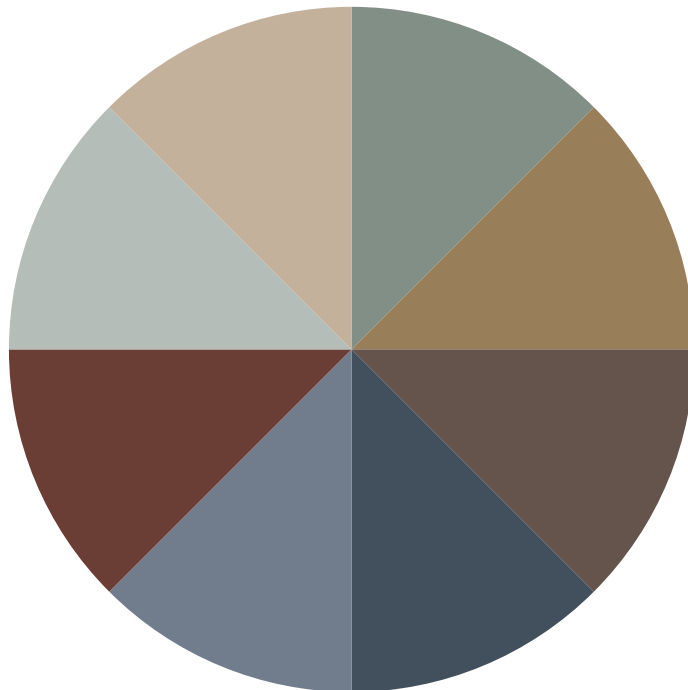
The Cognitive Processes / Information Processing Approach

Gardner's (1983) Theory of Multiple Intelligences

- Intelligence is a collection of multiple *intelligences*; independent of others, but interacting

What are your 'multiple intelligences'?

Gardner's multiple intelligences



- Linguistic
- Logical-mathematical
- Spatial
- Musical
- Bodily-kinaesthetic
- Interpersonal
- Intrapersonal
- Naturalistic

Measuring Intelligence

Intelligence tests

- Binet - developed intelligence testing – SEN children
- Assess a person's mental abilities and compare them with the abilities of other people, by means of numerical scores.
- Stern (1912): formula of Intelligence Quotient (IQ)
- Based on an operational definition of intelligence.

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

Achievement tests: How much a person has learned so far

- Can predict future performance in similar situations
- Assumes equal opportunity to learn material being tested

Aptitude tests: Novel puzzle-like problems - go beyond prior learning

- Measures potential for future learning and performance
- Supposedly fairer (less dependent on prior knowledge) – but tests rarely truly independent of prior learning
- May not be relevant to success in real-world situations

Measuring Intelligence

Weschler Adult Intelligence Scale (WAIS tests):

- Series of sub-tests that fall into two classes: verbal and performance
 - Three summary scores; *verbal IQ*, *performance IQ*, and *full-scale IQ*.
 - Various separate scores for a number of specific skills

Verbal	Performance
General information	Picture completion
Similarities	Picture arrangement
Arithmetic reasoning	Block design
Vocabulary	Object assembly
Comprehension	Digit-symbol substitution
Digit span	Recall of digits

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
- Alternative/novel abilities considered:
 - e.g. social, practical and emotional intelligence
 - Encompass non-cognitive traits (affective, interpersonal, dispositional)
 - Thus often referred to as ‘hot intelligences’ (contrast with logical, analytical, ‘cold’)

Heredity and the environment

- Genetic factors can influence the effects produced by the environment
 - No single 'intelligence gene'
- Environment can influence how genes express themselves
 - Both shared and unshared environmental factors are involved
 - Educational experiences are important

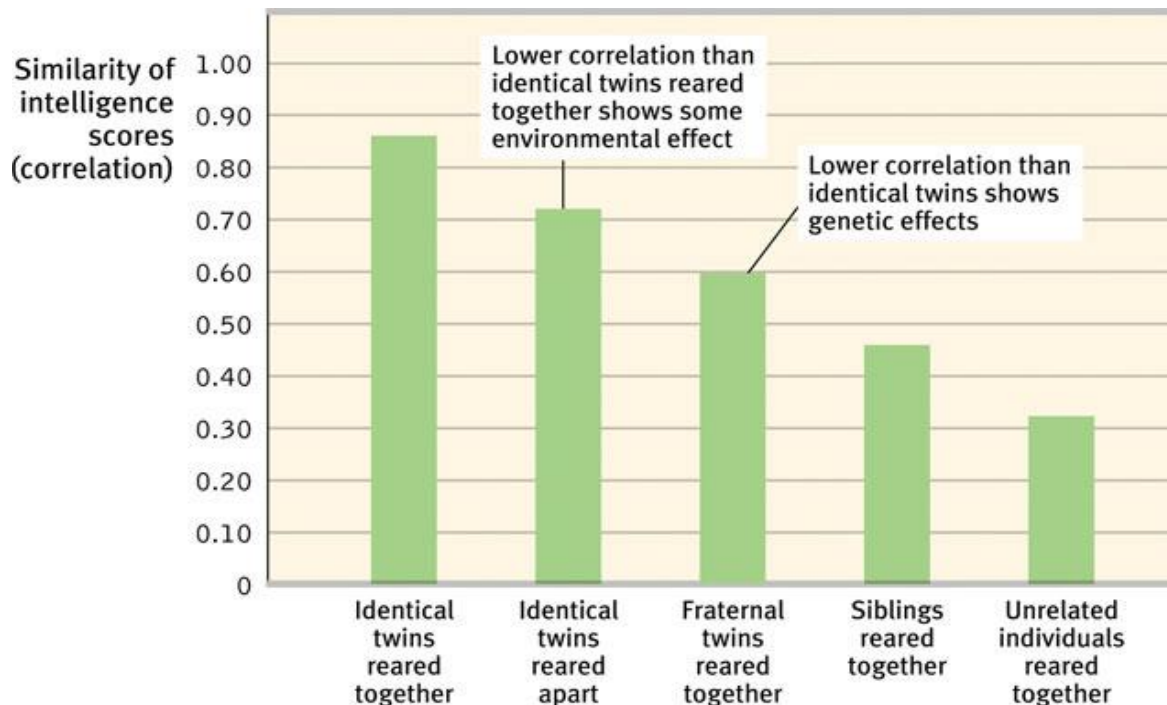
Environment and Intelligence

- Twin and adoption studies (Plomin et al, 2007)
- The more genetically similar people are, the more similar they tend to be in IQ (*the greater the concordance between their IQ scores*)
- Genetic factors more important as people age (Plomin and Spinath, 2004)
 - New genes begin working as new cognitive processes emerge?
 - Genetic factors increase as people select/create environments compatible with genetic characteristics?

Genetic Influences

Identical (MZ)	Fraternal (DZ)
100% of genes	Estimated 50% of genes

- Studies of twins, family members, and adopted children suggest a significant genetic contribution to intelligence
 - e.g., Bouchard's Minnesota study of Twins Reared Apart



(Bouchard & McGue, 1981)

Genetic Influences

- Genes important foundations of g factor (Plomin et al, 2007)
 - But - no single 'intelligence gene'
 - Large numbers of interacting genes
 - Different combinations underlie different abilities
- (Lykken, 2006)
- Some genes linked to intelligence identified (Posthuma and de Geus, 2006)
 - But – environment important

Flynn Effect (Flynn, 1987, 1998) – people in western world achieving higher IQ scores

unlikely that genes underlying increase
most likely – schooling, more stimulating environments, technology (and possibly nutrition)

Environmental influences

- Neisser et al. (1996) - four main areas of environmental effects on intelligence

1) **Education and school**

Going to school is likely to increase your abilities and increase your intelligence

Intelligence is likely to influence your attendance at school and length of schooling

2) **Biological variables and Maternal effects**

e.g. Nutrition, Lead, Prenatal factors

e.g. Prenatal nutrition and alcohol consumption

3) **Family environment**

Shared and non-shared environments can influence intelligence (Neisser et al., 1996)

4) **Culture**

Can affect not only intelligence, but also the type of intelligence that might develop

(Neisser et al., 1996)

IQ tests (e.g. WAIS) – culture-specific

BREAK



10 MINUTES!

What is personality?

- In certain respects, each of us is:
 - Like *all other* people
 - Like *some other* people
 - Like *no other* people
- Personality: the distinctive and relatively enduring ways of thinking, feeling and acting that characterise a person's responses to life situations
- Three important aspects:
 - Personality is unique
 - Personality is consistent
 - Personality is stable

The Trait Perspective

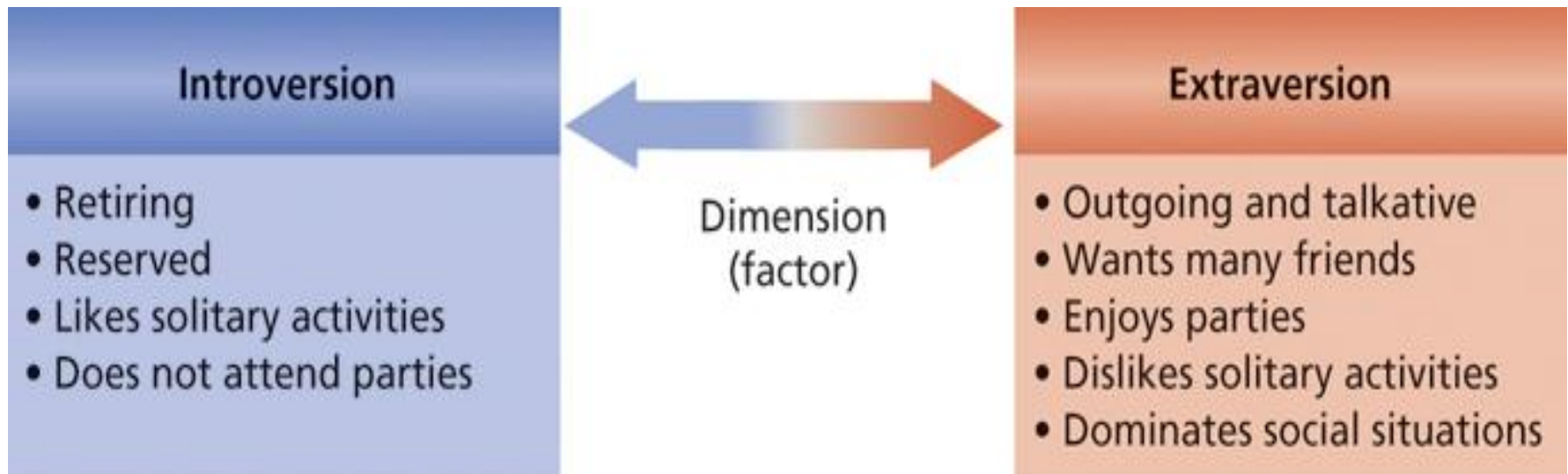
Goals of trait theories:

- Describe the basic classes of behaviour that define personality
- Devise ways of measuring individual differences in personality traits
- Use these measures to understand and predict behaviour

- **Personality traits:**

Relatively stable cognitive, emotional, and behavioural characteristics of people that help us establish their individual identities and distinguish them from others

The Trait Perspective

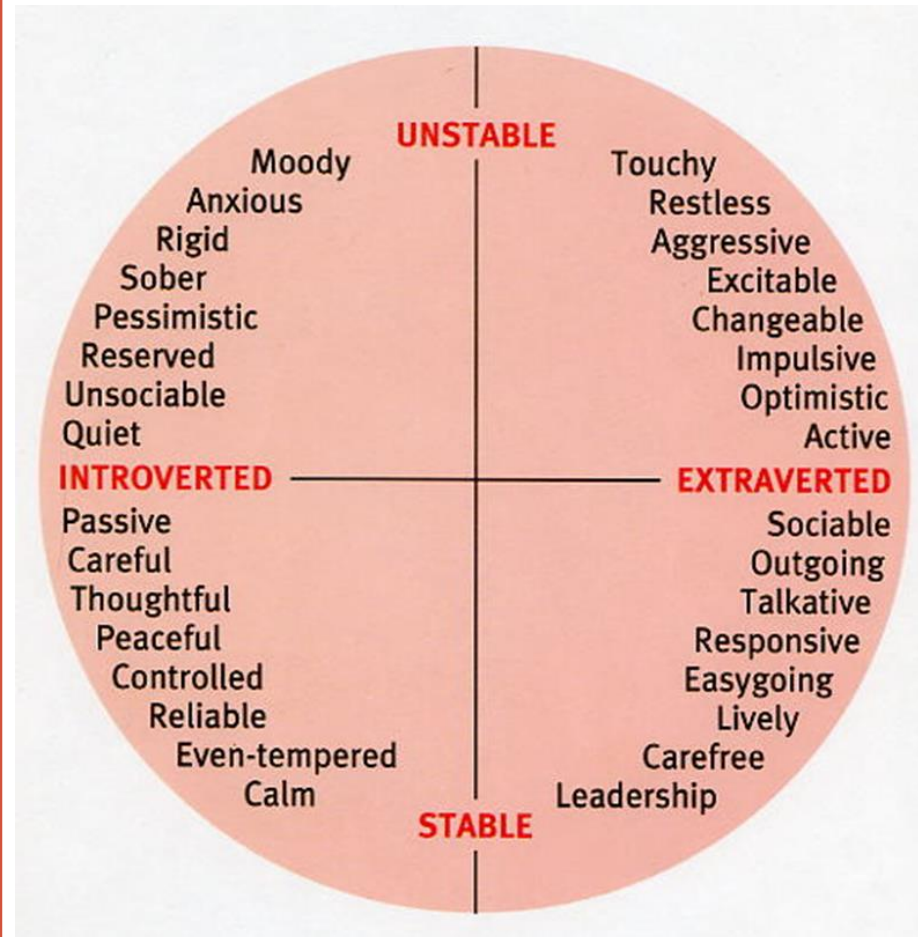


The Trait Perspective

Super-traits

- **Eysenck (1965) - two-factor model**
 - two statistically independent basic dimensions
 - **Extraversion**
 - **Neuroticism**
- Later added **psychoticism**
 - aggressive, cold, egocentric, impersonal, impulsive, antisocial, unempathetic, creative and tough-minded
- Involved changes to 'extraversion'

NEUROTICISM

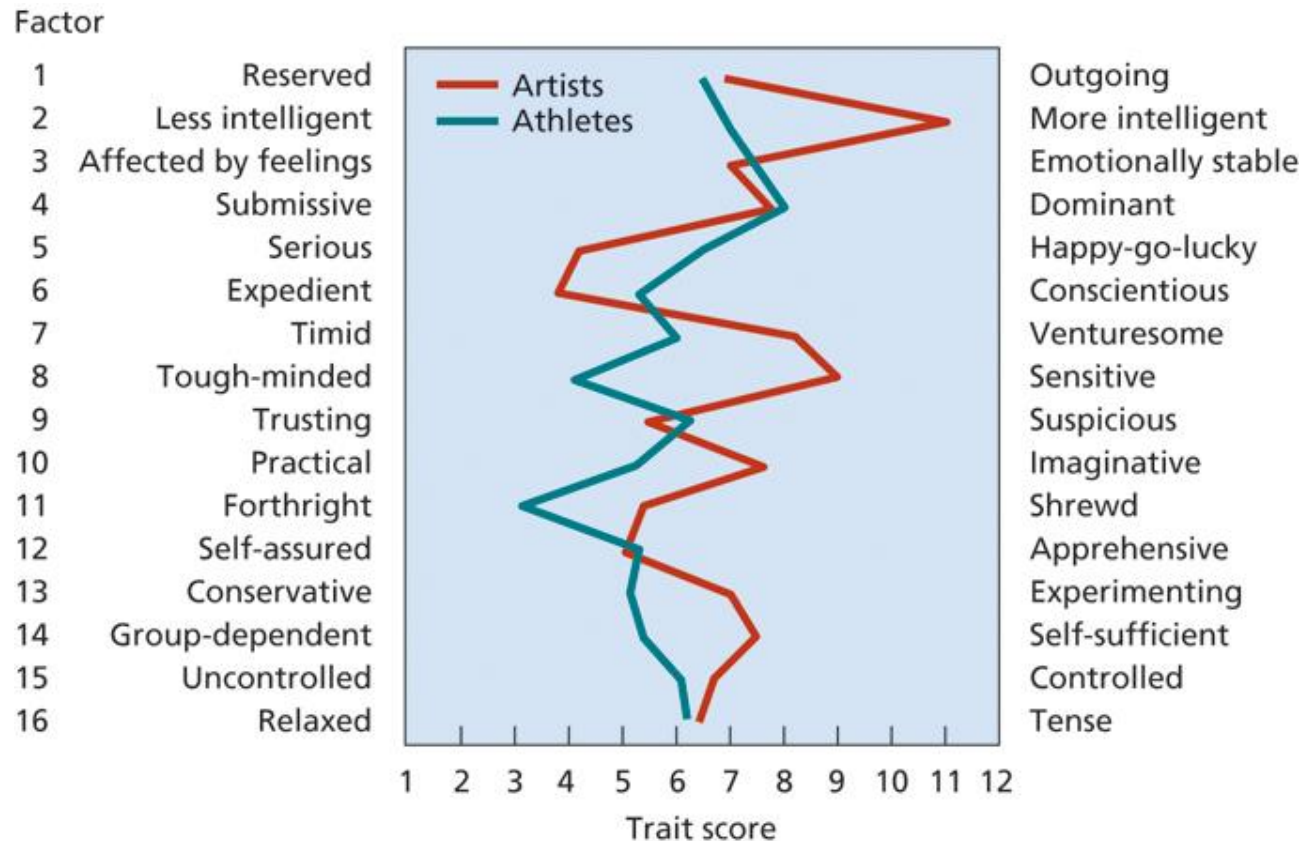


The Trait Perspective - Cattell's (1965) 16 Personality Factors

Two basic categories of traits:

Surface traits: features that make up the visible areas of personality

Source traits: underlying characteristics of a personality



The Trait Perspective

The **Five Factor Model** (McCrae & Costa, 2003)

- Proposes that five higher-order factors capture the basic structure of personality

- Openness to experience
- Conscientiousness
- Extraversion
- Agreeableness
- Neuroticism



The Trait Perspective

Five-factor Model of Personality (McCrae and Costa, 2003) OCEAN

Might be universal to the human species (e.g. John and Srivastava, 1999; Trull and Geary, 1997)

Openness vs Closedness to experience	curious, imaginative, artistic, excitable, unconventional
Conscientiousness vs Lack of direction	efficient, organised, not careless, thorough, self-disciplined, not impulsive
Extraversion vs Introversion	sociable, forceful, energetic, adventurous, enthusiastic, outgoing
Agreeableness vs Antagonism	forgiving, not demanding, warm, not stubborn, not show-off, sympathetic
Neuroticism vs Emotional stability	tense, irritable, not contented, shy, moody, not self-confident

- Six additional facets added to each of the Big Five - sharper predictions

The Trait Perspective

- Some personality traits tend to be more stable over the lifespan than others
 - Introversion-extraversion, self-esteem, emotionality, and activity level remain relatively stable
 - Neuroticism and openness tend to decline with age
 - Agreeableness and conscientiousness tend to increase with age

Evaluation of the Trait Perspective

- Focuses attention on the value of identifying, classifying and measuring stable, enduring personality dispositions
- Need to focus on how traits interact with each other
- Focuses only on description, not explanation

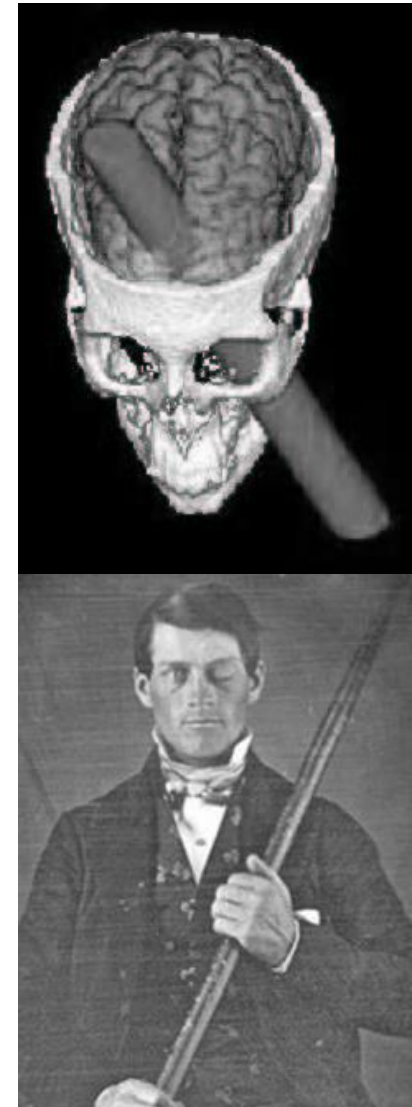
Biological Approach to Personality

- **Temperament** - emotionality, sociability and impulsivity can be seen even in infants (Buss and Plomin, 1975)
- Temperamental factors not personality 'traits' - biological building blocks (Buss and Plomin, 1984)
- Eysenck: Extraversion and Stability - variances due to differences in individuals' normal patterns of arousal within the brain
 - extreme **introverts** chronically over-aroused brains
 - extreme **extraverts** chronically under-aroused brains
- Introversion/extraversion: customary level of arousal
- Stability – Instability: suddenness of shifts in arousal
- Unstable people: nervous systems show large, sudden shifts in arousal
- Stable people: show smaller and more gradual shifts

(Pickering and Grey, 1999)

Evaluation of Biological approach to Personality

- Strong evidence that brain functioning influences responses of individuals
- Bokenau et al (2006) – approx. 25% of behavioural variation can be attributed to genetic factors, which influence how we adjust our behaviour to different situations
- But – cannot separate biological from social (e.g. Phineas Gage)
- Biological functions act in combination with social situations



- **Behaviourism:**

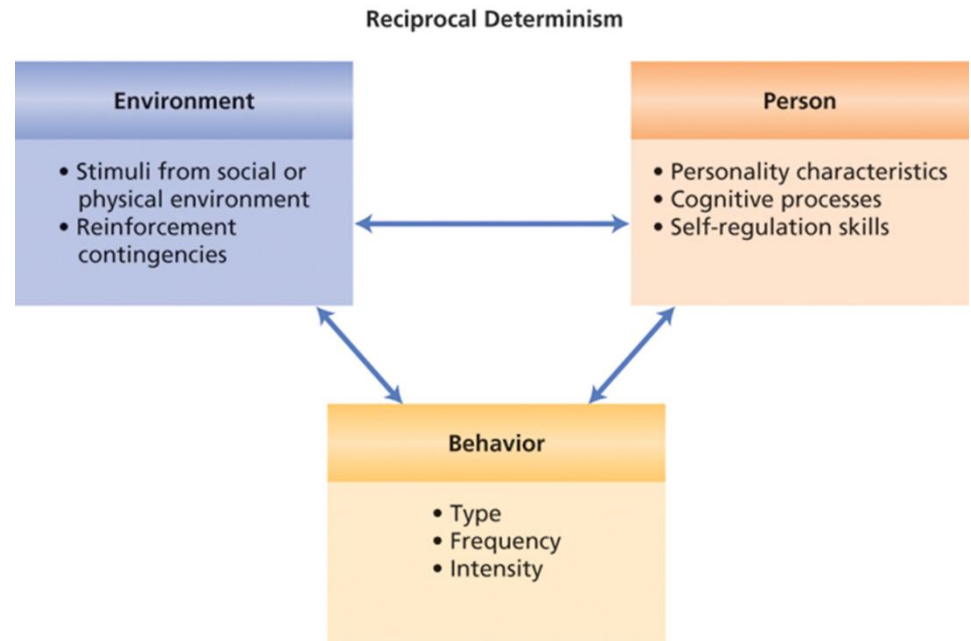
- Humans as reactors to external events - no internal 'personality'

- **Social-Cognitive theories:**

- Combine the behavioural and cognitive perspectives into an approach that stresses the interaction of a thinking human with a social environment that provides learning experiences

- **Reciprocal determinism:**

The person, the person's behaviour, and the environment all influence one another in a pattern of two-way causal links



Culture and Personality

- Influence of cultural factors on family and community practices
- Western - more complex than some hunter-gatherer cultures?
 - independent compared to interdependent Eastern cultures?
- Markus and Kitayama (1998) - cultural differences between Japanese and European-American students' descriptions of themselves
 - e.g. 96% of American students described themselves as 'special' compared to 55% of the Japanese students
- Individualistic and Collectivistic cultures e.g. Triandis and Suh (2002)
 - American students described themselves in terms of personal traits, abilities and dispositions - Japanese students used terms related to social identity

Culture and Personality

- Cultural embeddedness and cultural individualism influences self-concept and emotional lives

Americans - more self-oriented positive emotions

Japanese - more interpersonally oriented positive emotions

(Kitayama et al, 2000)

- Personal traits predicted behaviour less in collectivist cultures (Church and Katigbak, 2000)

Evaluation

- Are personality differences attributed to the individualistic and collectivist nature of the cultures concerned? Not everybody in these cultures embrace either individualist or collectivist goals
- European-Americans are less collectivistic than Chinese people, but are no less collectivistic than Japanese people (Oyserman et al, 2002)
- Most studies of individualism/collectivism have compared Japanese and Chinese people with European Americans – so findings likely to be culture-specific

Summary

Intelligence

- Psychometric approach
- Cognitive processes approach
- Types of intelligence
- Measuring intelligence
- Genetic heritability

Personality

- Trait perspective
- Biological approach
- Social-cognitive approach
- Culture and Personality

Useful Reading

Gross, R. (2010). *Psychology: The science of mind and behaviour* (6th ed). London: Hodder Education.

Chapter 41 (Intelligence)

Chapter 42 (Personality)

Mahoney, B. (2011). *Personality and Individual Differences*. Exeter: Learning Matters Ltd.

Maltby, J., Day, L. and Macaskill, A. (2009). *Personality, Individual Differences and Intelligence*. London: Pearson/Prentice Hall.