Psychometrics for HR

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Programme

- ▶ Introduction to tests
- ▶ Measurement Theory
- ▶ Using tests in selection
- ▶ Issues in test use

Introduction to tests

What is a test?

- A standardised task or series of tasks designed to assess a characteristic of an individual or group with results expressed on a well defined scale

Some Test Uses (1)

- Clinical
  - To diagnose
  - To monitor progress or deterioration
  - To provide insight to support treatment
  - Can be mental or physical health

Some Test Uses (2)

- Educational
  - To diagnose
  - To understand educational need
    - Special educational need
    - learning disabilities
  - To classify or select for particular programs
  - To monitor progress
  - To measure educational outcomes
    - Learners, Teachers, Institutions

Some test uses (3)

- ▶ Forensic
  - ▶ To understand offending behaviour
  - ▶ To manage offenders
  - ▶ Risk Assessment
  - ▶ Mental Health Assessment
- ▶ Sports
  - ▶ To identify and overcome blocks in performance

Occupational Test Uses

- ▶ Recruitment and Selection
- ▶ Talent Management
- ▶ Individual development
- ▶ Team building
- ▶ Performance management
- ▶ Leadership development
- ▶ Coaching
- ▶ Organisational Culture management

Types of tests

- ▶ Tests of maximum performance
  - ▶ Intelligence (IQ)
  - ▶ Verbal Reasoning
  - ▶ Perceptual Accuracy
  - ▶ Speed of processing
- ▶ Tests of typical performance
  - ▶ Personality
  - ▶ Learning Style
  - ▶ Values

Closed or Open Questions

- ▶ Closed
  - ▶ Multiple Choice, Rating Scales, Forced Choice
  - ▶ Easy to score
  - ▶ Difficult to develop
  - ▶ Restricted Content
- ▶ Open
  - ▶ Essays, Sentence Completion, Projective
  - ▶ Difficult to score

Example Questions

- ▶ What is the capital of Serbia?
  - a. Belgrade b. Ljubljana c. Sarajevo d. Zagreb
  - a. Belgrade b. Lisbon c. Singapore d. Yerevan

- ▶ When I find myself in a new place …
  - I like to explore to see what happens
  - I prefer to have a guide or guidebook
  - I make sure I know how to get home

Using Tests in Occupational Context

- ▶ Try to use measures designed for this context
- ▶ Make sure measure is appropriate for
  - ▶ Assessment aim
  - ▶ People to be assessed
  - ▶ Context
- ▶ Avoid measures of abnormal behaviour
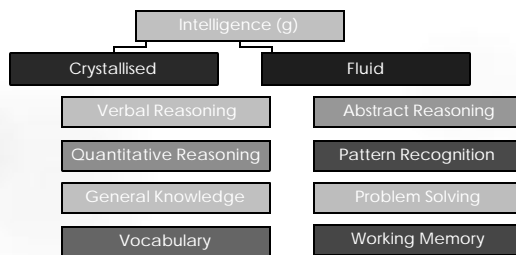- ▶ Avoid clinically significant measures

Ability tests

- Measures of maximum performance
- Measure different aspects of cognitive functioning
- Aptitude or ability?
- Single best predictor of
  - Training outcomes
  - Job performance
  - Meta-analyses from Salgado, Hunter, Schmidt, Ones and others

Intelligence Tests

- First developed in early 1900s to measure suitability for education by Binet and Simon
- Wexler Tests - WAIS
- IQ Scale
  - 100=average
- Multiple subtests for accurate measure of multifaceted performance
- Not appropriate for occupational use

Structure of intelligence

Intelligence (g)

Crystallised — Fluid

Crystallised	Fluid
Verbal Reasoning	Abstract Reasoning
Quantitative Reasoning	Pattern Recognition
General Knowledge	Problem Solving
Vocabulary	Working Memory

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In occupational use

- Crystallised intelligence generally more job relevant
  - Understanding information
  - Using data
  - Functional problem solving
- Fluid intelligence most useful for dealing with entirely novel situations

Raven's progressive matrices

- Developed in 1930s
- Powerful measure of fluid intelligence
- Not language dependent
- No relation between tasks and jobs
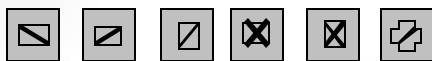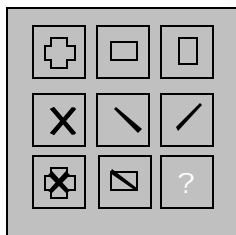
Verbal Tests

- ▶ Vocabulary
  - ▶ Simple measure of language skills
  - ▶ Predictive of general comprehension skills
  - ▶ Impacted by opportunity to learn
  - ▶ Straightforward to coach
  - ▶ Problems in assessing non-native speakers

Verbal Comprehension

- ▶ Typically passages followed by questions
- ▶ Most jobs require working with information
- ▶ Mimics work related tasks – content validity
- ▶ Can be business relevant – face validity
- ▶ Can measure at various levels of difficulty

Verbal Example 1

New Product News reported the introduction of over 90,000 new food products. Most of these new entries were line extensions, especially new flavours of existing brands. However, there were hundreds of imaginative, truly new food concepts designed to exploit the consumer's changing taste, nutrition and convenience needs.

- ▶ Food producers often extend the range of flavours available for existing products.
  - a. True
  - b. False
  - c. Cannot Say

Verbal example 2

The _____ of the staff liked the new office environment but there were still a few individuals who were upset by the change.

    a. experience
    b. managers
    c. minority
    d. majority

Quantitative reasoning

- ▶ Can range from simple arithmetic to complex problem solving
- ▶ Many jobs require working with numbers
  - ▶ Need to measure relevant skill areas
- ▶ Consider whether speed of processing, important

Quantitative Example 1

26 + 95 =

A	B	C	D	E
111	116	121	126	131

£1114 is deposited in a savings account. Interest of 4.5% is added at the end of each year. How much is in the account after 3 years?

A	B	C	D	E
£1164.13	£1196.85	£1264.39	£1271.26	£1289.45

Quantitative Example 2

Box X	Box Y
12V + W	5V + 2W

A	B	C	D
Quantity in Box X is larger than quantity in Box Y	Quantity in both boxes is equal	Quantity in Box X is smaller than quantity in Box Y	There is not enough information to decide which quantity is larger

Quantitative Example 3

Team	Number of Home Games Won	Number of Away Games Won	Total Points
Alice's Wonders	7	7	98
Famous Five	6	9	104
Northern Giants	8	6	84
Secret Seven	4	3	49
Woodland Elves	2	1	45

Which team won the most games?

A	B	C	D	E
Alice's Wonders	Famous Five	Northern Giants	Secret Seven	Woodland Elves

How many points are awarded for each game?

A	B	C	D	E
5	7	9	15	Not possible to tell

Quantitative Example 4

▶ What is the next number in the series?

1, 3, 2, 4, 3, 5, ….   A. 3   B. 4   C. 5   D. 6   E. 7

2, 2, 3, 6, 8, 24 ….   A. 27   B. 32   C. 48   D. 72   E. 96

1, 2, 3, 5, 7, 11 ….   A. 13   B. 15   C. 17   D. 19   E. 21

Checking

Which of the options on the right is identical to the data on the left?

2679532	a. 2679533	ZqW!BDjiK9;	a. ZqW!BDjiK9;
	b. 2678532		b. ZqW!BDjiR9:
	c. 2619532		c. ZqW|BOjiK9;
	d. 2679523		d. ZqW!BDijK9;
	e. 2679532		e. SqW!BDjiK9;

Measuring Personality

Personality

▶ characteristic patterns of thought, emotion and behaviour together with the psychological mechanisms - hidden or not - behind those patterns.

Personality Paradigms

Psychoanalytic Theory

Unconscious

Superego

ID

Conscious

Ego

Freud, Jung
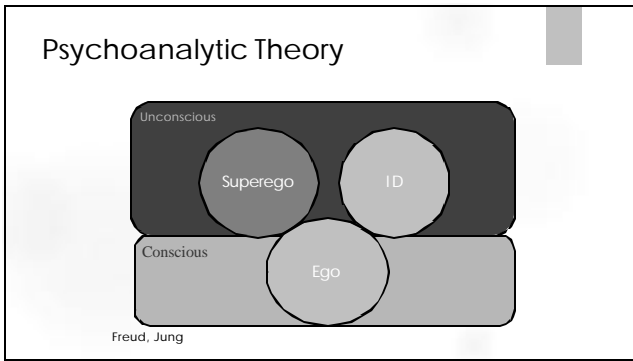
Behaviourist Learning Theories

► Behaviour is contingent on learnt outcome

► Rewards

► Extrinsic: Tokens, money, food, praise, positive regard, stimulation

► Intrinsic: Interest, self-esteem, achievement, endorphins

Punishment

Verbal or physical

Withdrawing privilege, reward, stimulation

Restricting freedom

## Social Learning Theory

- ▶ Role models
  - ▶ Demonstrate emoti
    and behavioural res
  - ▶ Important in socialis

- ▶ Cognitive models
  - ▶ Beliefs about self an
    world affect behavi
    - ▶ Self worth
    - ▶ Learned Helplessnes
    - ▶ Learned Optimism

Humanistic Psychology

- ▶ Rogers
  - ▶ Embrace existential
    living
  - ▶ Flexible self concept
- ▶ Maslow
  - ▶ Hierarchy of needs
  - ▶ Self actualisation

Self - actualisation
Esteem
Social
Safety
Physiological
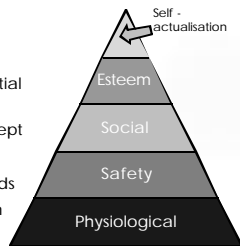
Occupational Approaches

- ▶ Descriptive rather than explanatory
- ▶ Provides individualised profile or description
- ▶ Consistent with both genetic and environmental explanations
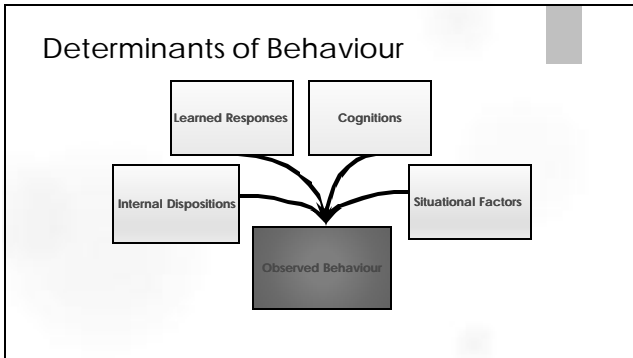- ▶ Focus on normal rather than abnormal

Trait versus Type

Trait	**Type**
▶ Continuous scale	▶ Categories
▶ Many levels	▶ Fixed number of alternatives
▶ Differentiated Profile	▶ Integrated style
▶ 16PF	▶ MBTI
▶ OPQ	▶ Belbin Team Types
▶ CPSQ	

Personality - an empirical definition

▶ A person's typical or preferred style of behaviour
  ▶ Requires behaviour to show some consistency across situations
  ▶ Based on preferences – recognises that people can behave in different ways
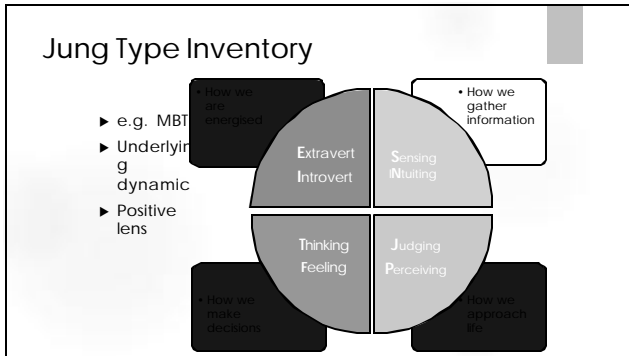 ▶ Normal behaviour rather than psychopathology

Is behaviour consistent across situations?

▶ The same person behaves differently in different situations
▶ Behavioural correlation across situations = 0.4+
▶ Moderate consistency - the situation is a strong factor in determining behaviour

Determinants of Behaviour

Learned Responses

Cognitions

Internal Dispositions

Situational Factors

Observed Behaviour

Five Factor Model

- ► Parallel work on factor structure of adjectives and other data sets
- ► Norman, Goldberg, Digman
- ► Similar underlying factor structure found in many models
- ► Provides a common language for different measures
- ► Encapsulates much of personality in a broad framework

Five Factors

- ► Extroversion - Introversion
- ► Emotional Stability - Anxiety
- ► Openness - Traditional
- ► Agreeableness – Tough Minded
- ► Conscientiousness – Easy Going

Jung Type Inventory

- e.g. MBTI
- Underlying dynamic
- Positive lens

- How we are energised
- How we gather information

Extravert Introvert
Sensing iNtuiting

Thinking Feeling
Judging Perceiving

- How we make decisions
- How we approach life

Extroversion

▶ Outgoing	▶ Introverted
▶ Talkative	▶ Quiet
▶ Gregarious	▶ Shy
▶ Assertive	▶ Reserved
▶ Active	▶ Submissive
▶ Excitement Seeking	▶ Self-Contained
▶ Positive Emotions	▶ Retiring
▶ Energetic	▶ Withdrawn

Do you tend to?

Introvert

- Be reserved
- Enjoy spending time alone
- Find it easy to focus your attention
- Have a calm attitude to things
- Listen more than you talk
- Consider before you say things
- Talk slowly and quietly
- Stay with one subject at a time
- Find it tiring interacting with others

Extrovert

- Be animated
- Prefer to be around people
- Easily become distracted
- Be very enthusiastic about things
- Talk more than you listen
- Think out loud
- Talk faster and more animated
- Change subjects quickly
- Become energised from being with others