Individual Differences & Assessment

PSYC 301
Instructor: Melanie Standish

Overview

1 Introduction to Individual Differences

2 Human Attributes

3 Foundations of Assessment

4 Assessment Procedures

5 Special Topics in Assessment
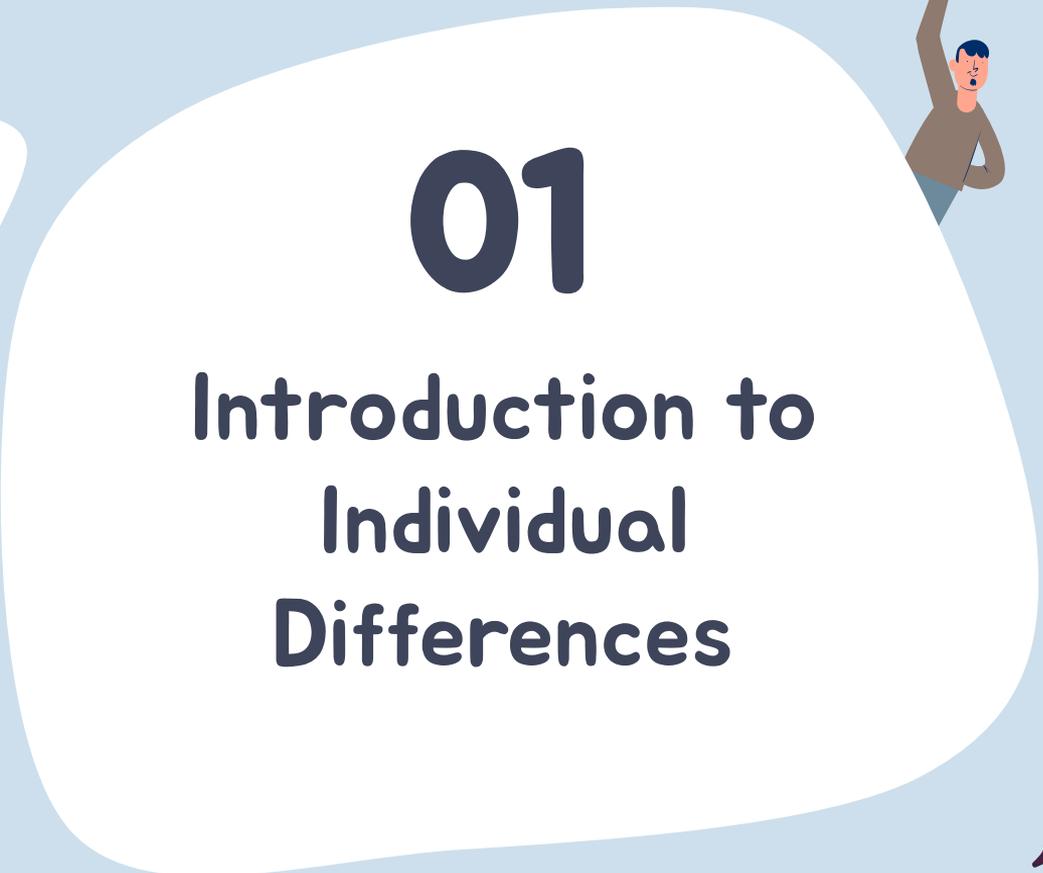
01

Introduction to Individual Differences

Individual Differences!

"Dissimilarities between or among two or more people."

Some History
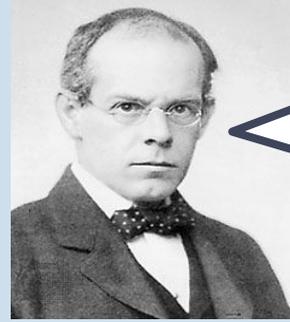
- Background
    - 1890 - Cattell & concept of "mental test"
    - Mental test - instrument designed to measure a subject's ability to reason, plan, and solve problems
    - Differential psychology - study of individual differences

Psychometrics

"practice of measuring a characteristic such as mental ability, placing it on a scale or metric."

Reminder:

Goals in identifying useful individual differences

Reliable

- Consistently measured
- Consistent over time

Construct Valid

- Correlated with what it should be (convergent validity)
- Not correlated with what it shouldn't be (discriminant validity)
- Criterion related validity

FUNDAMENTAL ASSUMPTIONS IN APPLYING INDIVIDUAL DIFFERENCES MODEL

- Adults have a variety of attributes that are **relatively stable** over a period of time

- **People differ** with respect to those attributes

- Relative differences among people on these attributes **remain even after training**

- Different **jobs require different attributes**

- These attributes **can be measured**

TODAY'S INDIVIDUALS DIFFERENCES

Knowledge

collection of discrete, related facts & information about a particular domain

Skills

practiced act or the capacity to perform specific task

Abilities

stable capacity to engage in a specific behavior; often not directly observable

Other Characteristics

interests, personality, etc.

02

Human Attributes

COGNITIVE ABILITY

"Involves ability to reason, plan, solve problems, comprehend complex ideas, & learn from experience."

- The Old Way
  - Intelligence Quotient (IQ)
- The New Way
  - Spearman's g
  - Fleishman's s
  - Cattell's theory
    - Crystallized intelligence
    - Fluid intelligence

Also known as intelligence, general mental ability (GMA), cognitive ability, intellectual capacity

CARROL'S HIERARCHICAL MODEL
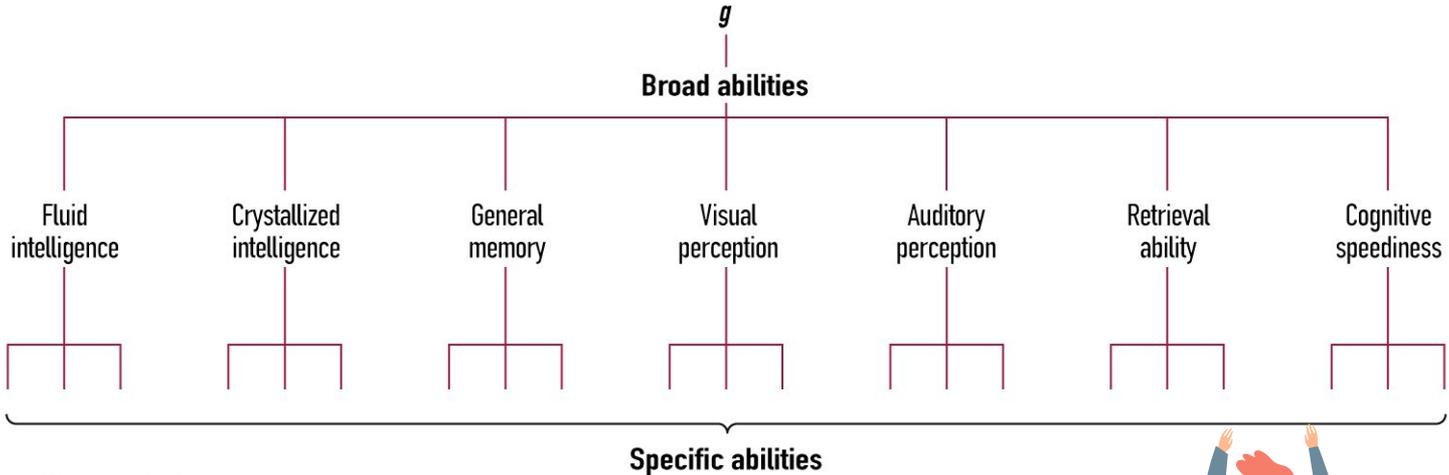

Figure 3.2
Carroll's
Hierarchical Model
Source: Carroll (1993).

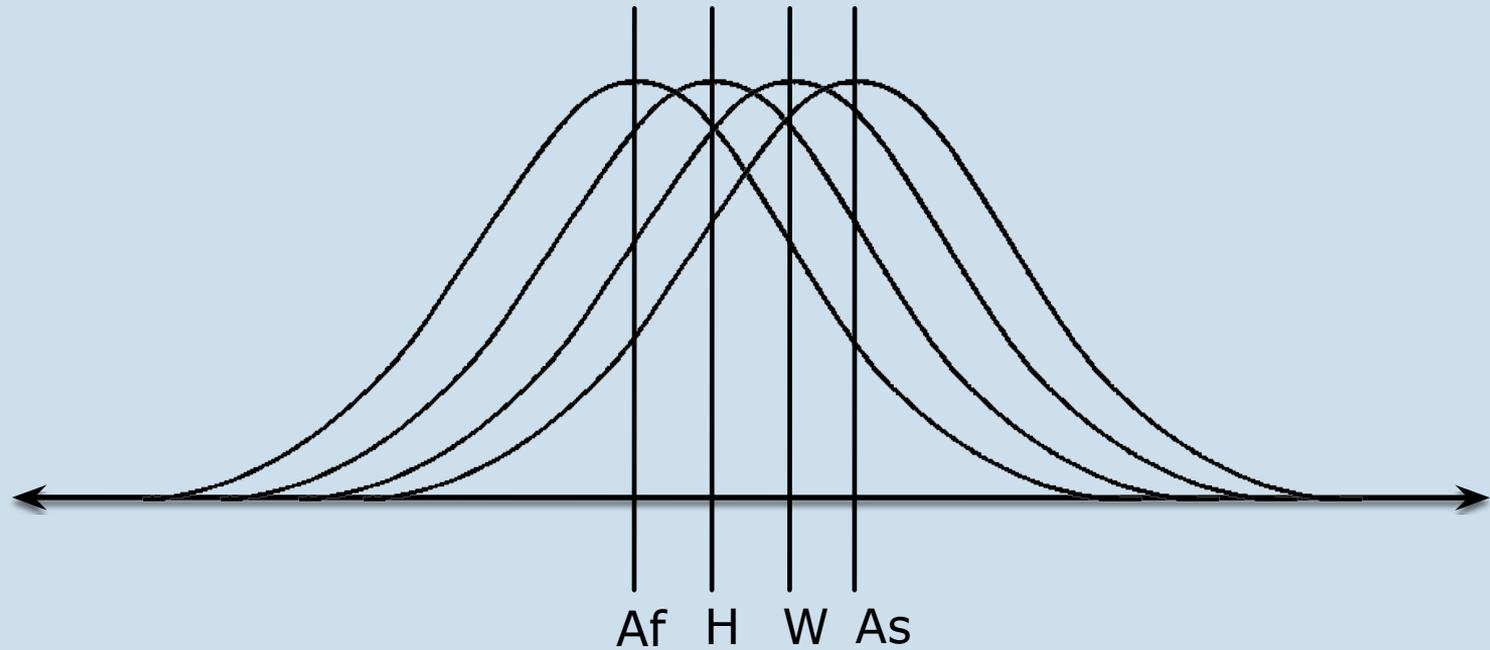# 'G' AND TIME

At the Individual Level

- Gradually decreases as we age (roughly 0.5 IQ pt / year)
- Fluid intelligence decreases while crystallized intelligence increases

At the Group Level

- Gradually increases with new generations
- The Flynn Effect (+ 1 SD)

RACIAL DIFFERENCES & 'G'

Af H W As

COGNITIVE ABILITY TESTS (CONT'D)

- Is "g" important at work?
  - "Yes", g predicts performance across many jobs
  - ↑ job complexity = ↑ predictive value of general intelligence tests
  - Pros:
    - 85 years of research shown GCA (g) to be best predictor of future performance and learning/training (r = .51; Schmidt & Hunter, 1998)
    - Lowest costs & most research & theory
  - Cons:
    - Adverse impact

Adverse Impact

"is the negative effect an unfair and biased selection procedure has on a protected class"

'SUPPLEMENTAL TYPES' OF INTELLIGENCE

- Emotional Intelligence (EQ)
  - "The ability to perceive and express emotion, assimilate emotion in thought, regulate emotion in self and others"
- Example items
  - "I almost always know exactly how I'm feeling"
  - "The variety in human beings makes life interesting"
  - "I try to think good thoughts no matter how badly I feel"
- Is this intelligence?

Interesting Read: Does leadership need emotional intelligence? (Antonakis, Ashkanasy, & Dasborough, 2009)

PHYSICAL ABILITIES

- Physical abilities
  - Muscular strength
    - How much?
- Cardiovascular endurance
  - How long?
- Movement quality
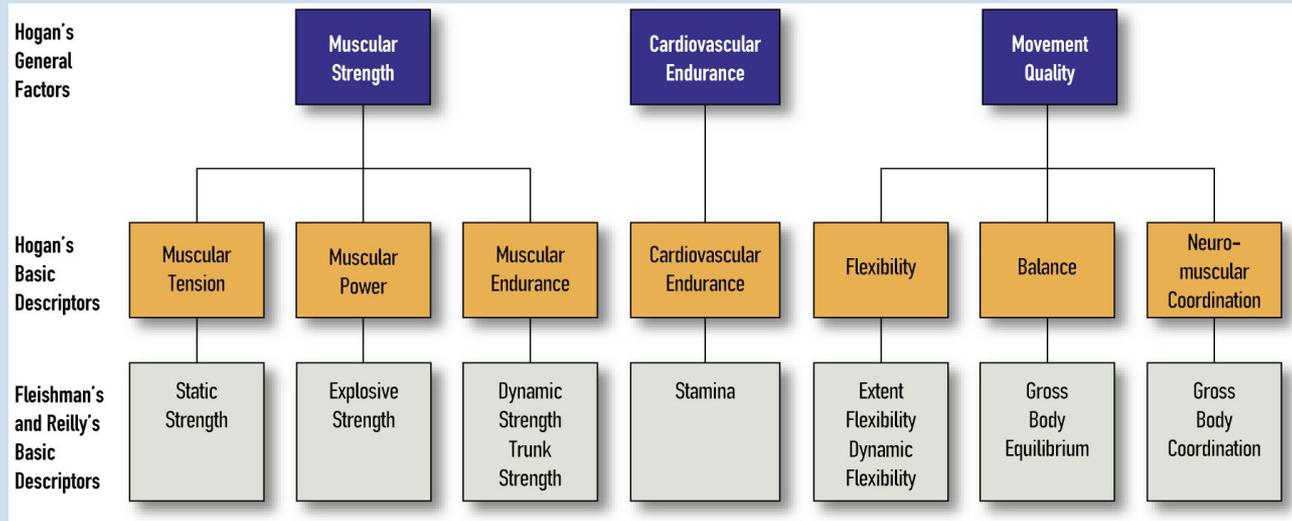 - How well?
- Use in organizations

FOR WHAT JOBS MIGHT PHYSICAL ABILITY BE IMPORTANT?

A MODEL OF PHYSICAL ABILITIES

| Hogan's General Factors	Muscular Strength			Cardiovascular Endurance	Movement Quality		
Hogan's Basic Descriptors	Muscular Tension	Muscular Power	Muscular Endurance	Cardiovascular Endurance	Flexibility	Balance	Neuro-muscular Coordination
Fleishman's and Reilly's Basic Descriptors	Static Strength	Explosive Strength	Dynamic Strength Trunk Strength	Stamina	Extent Flexibility Dynamic Flexibility	Gross Body Equilibrium	Gross Body Coordination

Figure 3.3: A Model of Physical Abilities
SOURCE: (Guion, 1998)

SENSORY ABILITIES

- Vision
- Touch
- Taste
- Smell
- Hearing
- Kinesthetic feedback
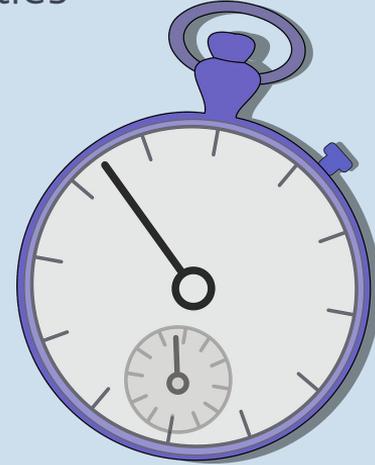
- Use in organizations
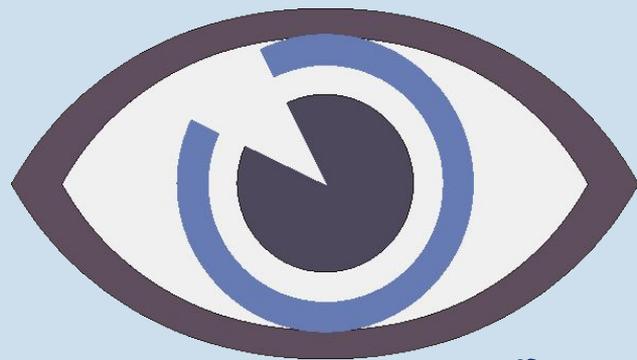
FOR WHAT JOBS MIGHT SENSORY ABILITIES BE IMPORTANT?

PSYCHOMOTOR ABILITIES

- Also called sensorimotor or motor abilities
- Fleishman's psychomotor abilities
  - Arm-hand steadiness
  - Manual dexterity
  - Finger dexterity
  - Control precision
  - Response orientation
  - Rate control
  - Reaction time
  - Wrist-finger speed

FOR WHAT JOBS MIGHT PSYCHOMETRIC ABILITIES BE IMPORTANT?

KNOWLEDGE

- Labels, facts, rules, procedures, plans, or goals pertaining to objects, events, processes, conditions, goals, objectives, or the self (Campbell, 2001)
- Several proposed structures
  - Cognitive psychology
    - Declarative knowledge and procedural knowledge
  - Sternberg
   - Academic and tacit knowledge
- Use in organizations

SKILLS

- Two major categories
  - **Observable skills**
    - Application of knowledge to solve a specific problem with a known solution
  - **Problem solving skills**
    - Application of knowledge and observable skills to solve problems without a known solution

- Use in organizations

VOCATIONAL INTERESTS

- One of the oldest individual difference measures
- Tendency to enjoy particular surroundings or activities
- Holland's vocational typology tends to dominate this entire area
  - Realistic
  - Investigative
 - Artistic
  - Social
  - Enterprising
  - Conventional

HOLLAND'S VOCATIONAL TYPOLOGY

Conforming

C

E   R

Extraverted —————————— Introverted

S   I

A

Nonconforming
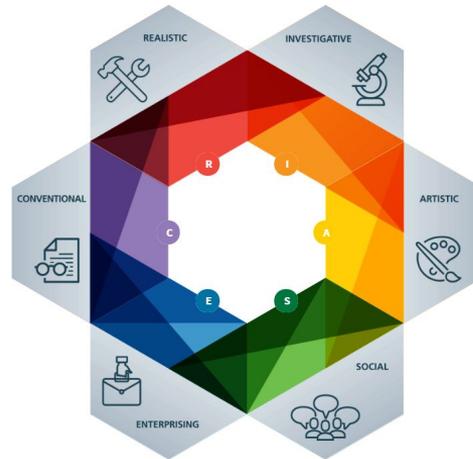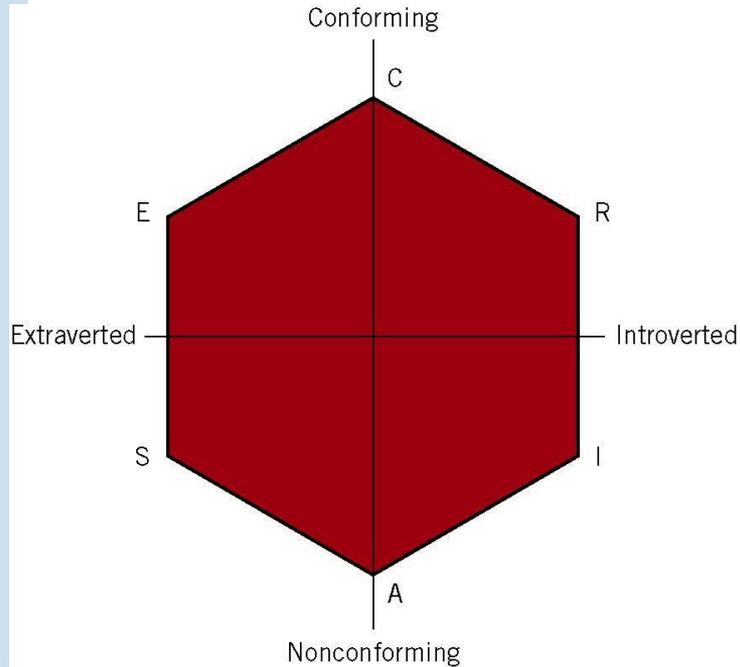
Figure 3.4
Interest Types
Underlying the Hexagonal
Representation of Holland's
Vocational Typology
Source: Hogan & Blake
(1996).

- Do vocational interests predict (1) academic performance or (2) job performance?

- Nye, Su, Rounds, & Drasgow (2012) conducted a meta-analysis

  - Interest score & academic performance, $\rho = .23$

  - Interest match & academic performance, $\rho = .32$

  - Interest score & job performance, $\rho = .20$

  - Interest match & job performance, $\rho = .36$

PERSONALITY
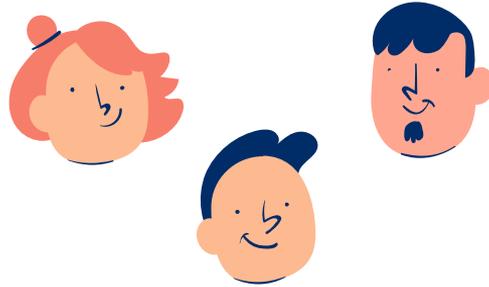
- Current major focus in I/O
- Generally, a relatively stable set of characteristics, tendencies and traits (not states)
- Why does this matter?
- Many potential personality traits

PERSONALITY
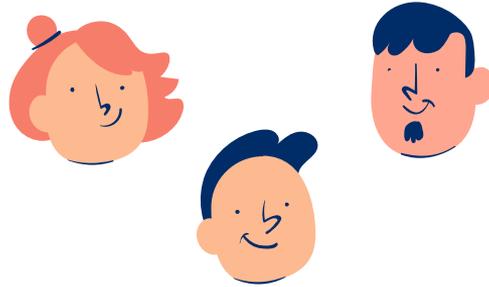
- Personality interacts with the situation to influence behavior
- Personality can help predict job performance
- Measurement of psychopathology vs. normal personality

PERSONALITY MEASURE DEVELOPMENT

Empirically-derived
- Items written first, no cohesive theory
- Hathaway's Minnesota Multiphasic Personality Inventory (MMPI)
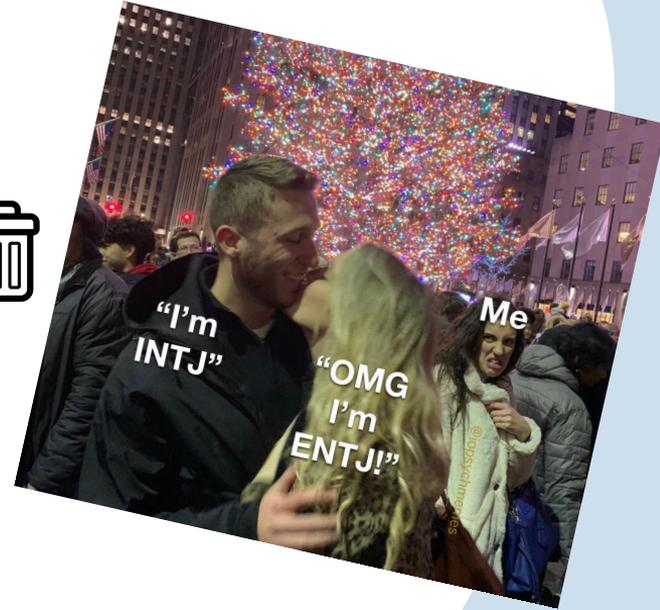
Theoretically-derived
- Myers-Briggs Type Inventory (MBTI)

Rational or Trait approach
- Organizes personality into a hierarchy
- Big Five / Five Factor Model

Costa & McCrae, Goldberg

Let's Take a Personality Test!

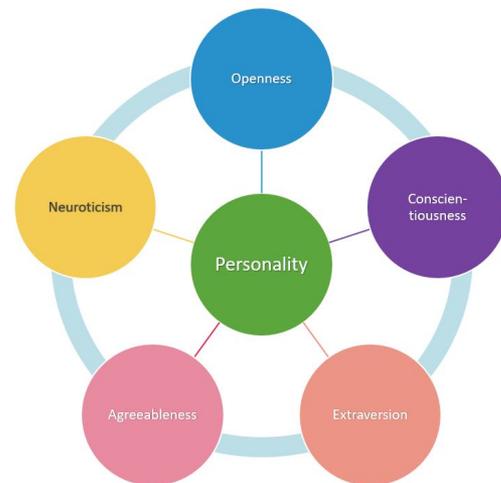# THE FIVE FACTOR MODEL (FFM)

- Five Factors and their respective Facets:
  - "OCEAN"
    - Openness to Experience
    - Conscientiousness
    - Extraversion
    - Agreeableness
    - Neuroticism / Emotional Stability

- (Mostly) Universal, cross-cultural hierarchy
    - HEXACO
    - H = Honesty- Humility

OPENNESS TO EXPERIENCE

- Those high in openness tend to be more curious, imaginative, playful, and artistically inclined than others.

- Facets
  - Fantasy, Aesthetics, Feelings, Ideas, Actions

- Example Item
  - I spend time reflecting on things. (+)
  - On a vacation, I prefer to go back to a tried and true spot. (-)

OCEAN

CONSCIENTIOUSNESS

- Favors organization, dependability, and achievement-orientation.
- Facets
  - Competence, Order, Dutifulness, Achievement-Striving, Self-Discipline, Deliberation
- Example Item
  - I am exacting in my work. (+)
  - Over the years I've done some pretty stupid things. (-)

OCEAN

EXTRAVERSION

- Sociability of an individual

- Facets

  - Gregariousness, Activity, Excitement-Seeking, Positive Emotions, Assertiveness

- Example Item

  - I am dominant, forceful, and assertive. (+)

  - I often feel uncomfortable around others. (-)

OCEAN

AGREEABLENESS

- The degree of courtesy, trusting, cooperation, and tolerance a person exhibits.
- Facets
  - Straightforwardness, Modesty, Altruism, Compliance, Trust
- Example Items
  - I sympathize with others' feelings. (+)
  - I am not interested in other people's problems. (-)

OCEAN

NEUROTICISM / EMOTIONAL STABILITY

- Neurotic individuals tend to lack emotional adjustment

- Facets
  - Anxiety, Anger, Depression, Vulnerability, Impulsiveness

- Example Item
  - I get upset easily. (+N/-ES)
  - I am relaxed most of the time (-N/+ES)

OCEA**N**

FFM TEST CHARACTERISTICS

- Reliability
  - Generally high: a = 0.8-0.9

- Valid
  - Barrick & Mount (1991)'s meta-analysis of criterion-related validity
    - Conscientiousness - job performance = .22
    - Extraversion - training performance = .26
    - Openness - training performance = .25
    - Others - both = ~.00
  - Compound traits

FFM TEST CHARACTERISTICS

- More Barrick & Mount (1991)
  - Conscientiousness criterion-related validities
    - Job performance = .22
    - Training performance = .23
    - Productivity = .17
    - Salary = .17
    - Consistently valid predictor across all occupational groups studied and all criterion types
- Hurtz & Donovan (2000) expanded
  - Agreeableness & neuroticism predict contextual performance

Your Personality

INTEGRITY

- Quality of being honest, reliable, and ethical
- Overt measures
  - E.g., How often have you arrived at work under the influence of alcohol?
  - Predict overall job performance better
- Personality-based measures
  - E.g., Are you a risk taker?
  - Predict CWBs better
- Concerns about faking

PERSONALITY & FAKING

Occurrence
- In the lab
  - The "fake good" and "fake bad" methods
- In the field
  - High-stakes testing
  - Hard to detect

Detection
- Lie detection scales
  - Overt vs. personality-based integrity testing
- Effect on Validity

GROUP DISCUSSION

Consider the job of "superhero."
Which of these individual
differences are relevant to this
job?

03

Foundations of Assessment

WHAT IS A TEST?

- Objective & standardized procedure for measuring a psychological construct using a sample of behavior

    - Attributes to be assessed ➡️ CONTENT
    - Ways to assess attributes ➡️ PROCESS

WHAT IS A TEST

- What is the meaning of a test score?
  - Norming & norm groups used to interpret and give meaning to a score

- Test users & test interpretation
  - Importance of training test administrators to correctly understand & interpret results

- Test battery
  - Collection of tests assessing variety of different attributes

ADMINISTRATIVE TEST CATEGORIES

- Speed vs. power tests
  - <u>Speed tests</u> have rigid & demanding time limits
    - Provide greater variability among candidates
    - Issue of relevance to job
    - May increase the risk of legal challenges

  - <u>Power tests</u> have no rigid time limits
    - Questions answered correctly by a smaller percentage of test takers

ADMINISTRATIVE TEST CATEGORIES

- Group vs. individual tests
  - Individual tests useful in assessing a candidate's style of problem solving
  - Group testing is valuable in reducing costs

- Paper & pencil vs. performance tests
  - Performance tests assess skill in performing tasks & knowledge of how to carry out actions

TESTING & CULTURE

- Bias
  - Situation in which a given test results in statistical errors of prediction for a subgroup

- Fairness
  - Value judgment about actions or decisions based on test scores

04

Assessment Procedures

COGNITIVE ABILITY TESTS

- Allow individuals to demonstrate what they know, perceive, remember, understand, or can work mentally

- Includes problem-solving, perceptual skills, developing or evaluating ideas, and remembering what one has learned

COGNITIVE ABILITY TESTS (CONT'D)

- Tests that produce a single score
  - e.g., Wonderlic Personnel Test (WPT) - 50 items to assess verbal, numerical, and spatial abilities
    - 12 minute administration (speed test)
    - High reliability and strong correlations with other, more elaborate, intelligence tests
    - Used by the NFL

COGNITIVE ABILITY TESTS (CONT'D)

- Tests of specific abilities
  - e.g., Bennett Test of Mechanical Comprehension
  - Other tests measure perceptual accuracy, memory, spatial relations, etc.
- Cognitive test batteries
  - Collection of tests that assess a variety of cognitive aptitudes or abilities
    - General Aptitude Test Battery (GATB)
  - Federal government uses in selection
    - Armed Services Vocational Aptitude Battery (ASVAB)

PHYSICAL ABILITY TESTS FOR FIREFIGHTERS

Stairway climb: Candidate wears fire-protective clothing and air tank and carries seven pieces of equipment up three flights of stairs, one piece at a time. Each piece of equipment weighs between 25 and 55 pounds.

Hose pull: Candidate wears air tank, stands in one spot, and pulls 50 feet of fire hose filled with water using a hand-over-hand technique.

Ladder pull: Candidate wears air tank and pulls a 16-foot ladder from the ladder bed of a fire truck, places it on the ground, picks it back up, and replaces it in the ladder bed.

Dummy drag: Candidate drags a 125-pound sandbag around a serpentine course of 40 feet. The candidate must keep one knee in contact with the ground and may not lift or carry the sandbag but must drag it.

Blind crawl: Candidate wears fire-protective clothing and an air tank. After putting on a blackened face mask, the candidate must crawl through a plywood maze that has several turns in it. In addition, there are sandbags located strategically throughout the maze. The maze is approximately 40 feet in length.

Pike pole: Candidate wears an air tank and alternately pulls and pushes a 75-pound weight attached to a pole hanging from a frame. The candidate must complete as many repetitions as possible in a 4-minute period. A repetition is defined as one push and two pulls.

Fan hang: Candidate wears fire-protective clothing and an air tank and lifts a 50-pound fan from ground level, hanging it on a standard door frame.
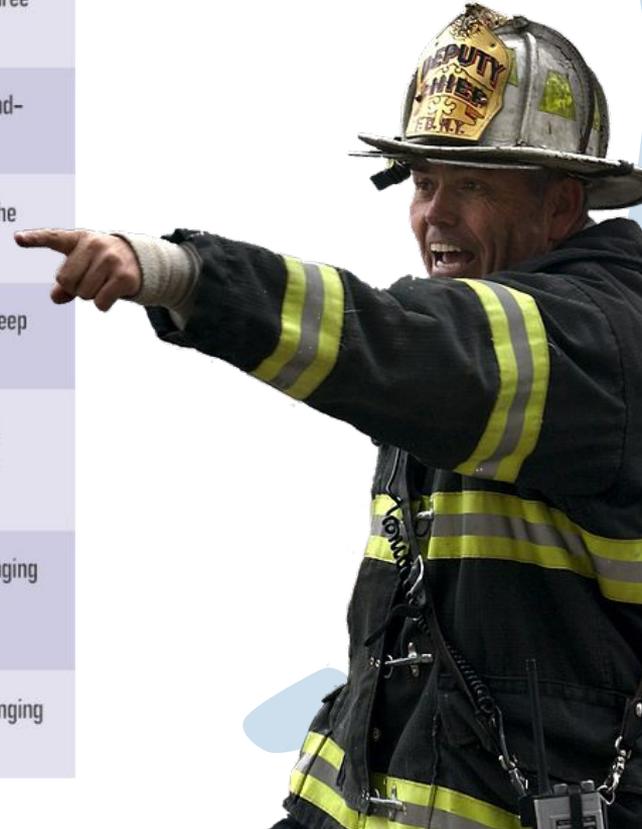
JOB INTERVIEWS

A
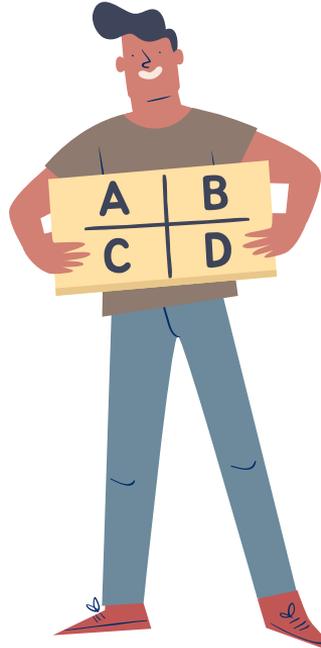
Interview

- How effective is your "typical" job interview at identifying (i.e., predicting) the best candidates?
  - A = Highly Effective
  - B = Effective
  - C = Ineffective
  - D = Highly Ineffective

- A = True/B = False - "I am good at reading people, give me 10 minutes with a person and I'll tell if you they'd make a good candidate to hire."

INTERVIEW

- Tend to cover job knowledge, abilities, skills, personality, & person-org. fit

- Structured vs. Unstructured Interviews
  - Structured interviews have higher validity
  - Unstructured interviews tend to be preferred by hiring managers

- Situational vs. Behavioral Interviews
  - Situational: what would you do if…
  - Behavioral: what did you do when…

ASSESSMENT CENTERS

- Collection of procedures used for evaluation, often for possible promotion

- Typical characteristics
  - Assessment done in groups
  - Assessment done by groups (i.e., assessors)
  - Multiple methods of assessment employed
  - Assessment centers have "feel" of relevance

WORK SAMPLE TESTS

- Measure job skills by taking samples of behavior under realistic, job-like conditions

- Examples:
  - Rudder control test for pilots
  - Speech interview for foreign student

SITUATIONAL JUDGMENT TESTS

- Present candidate with written scenario, then ask candidate to choose best response from series of alternatives

- Important characteristics:
  - Job-related
  - Well-accepted by test takers
  - Reduced adverse impact compared to other devices

05

Special Topics in Assessment

BIODATA

- Biodata
  - Includes type of information collected on an application blank
    - e.g., previous jobs, education, & special training
- Ecology model
  - Events constituting person's history represent choices made by individual to interact with his/her environment

GRADES & LETTERS OF RECOMMENDATION

- May be able to predict job offers, but not job success

- Little serious research on validity & fairness of these devices

COMPUTER-BASED ASSESSMENT

- Are we measuring the same thing we do with paper & pencil test or interview?

  Yes AND No

- Personality tests - YES (Salgado & Moscoso, 2003)

- SJT, biodata, and personality - YES (Ployhart et al., 2003)

- g - generally yes, unless test is speeded

- Computer-based testing puts limits on test-taking "style"
  - Sometimes can't go back and forth
  - Screen may only display one or two items

INTERNET-BASED TESTING

- Can be expensive - more useful for organizations that screen a large number of applicants

- Unproctored - concerns about faking and cheating
  - Need to verify answers before hiring

INTERNET-BASED TESTING

- Who is the a candidate
  - Individual submits expression of interest in employment
  - Employer considers individual for employment
  - Individual possesses basic qualifications for the position
  - Individual does not withdraw from further consideration

- Computer Adaptive Testing - test identifies test taker's level of ability and only asks questions to further refine ability level
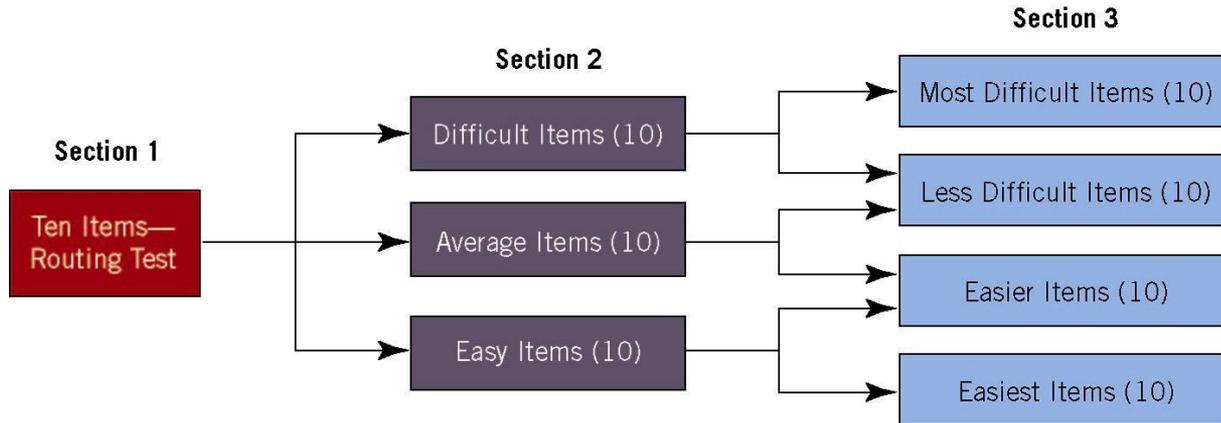
ROUTING TEST IN COMPUTER ADAPTIVE TESTING

Figure 3.13.

Social Media?

What do you think about using social media as a measure of individual differences?

Thanks!

Do you have any questions?

Don't forget… Quiz due Sunday at
11:59 PM CT

Alternative Resources