General Psychology
Psy 100

Testing and Intelligence

What We Will Cover in This Section

- Psychological Testing
  - Reliability
  - Validity
  - Types of tests.
- Intelligence
  - Overview
  - Models
  - Summary

Phenomenally Cool Demonstration

Key Concepts

Reliability

The stability or consistency of a measurement tool.

Validity

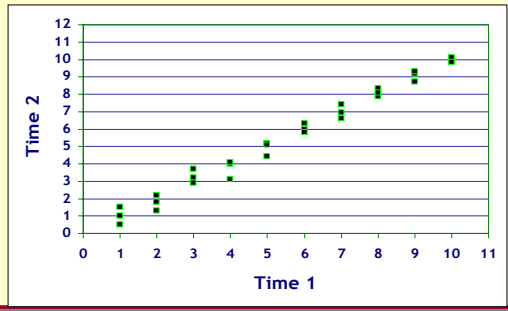
Are we measuring what we say we are measuring.

1. Test-Retest Reliability

Index of the stability of scores over time.

Administer Test A → Wait → Re-administer Test A

Test Retest Reliability Scatterplot

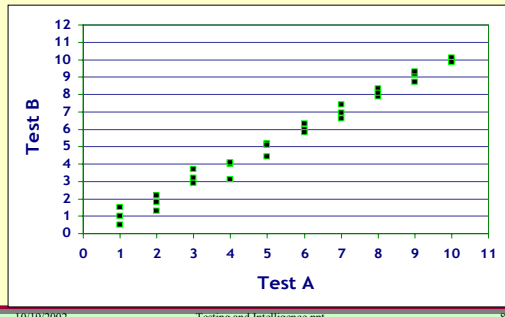


2. Alternate Forms Reliability

Index of the consistency of scores for several versions of the same test.

Administer Version A | **No significant wait** | **Administer Version B**

Alternate Forms Scatterplot



3. Internal Consistency

Techniques for determining if the individual test items are measuring the same thing, in the same way.

Sweeney's Test of Verbal Fluency

USE EACH OF THE FOLLOWING WORDS CORRECTLY IN A SENTENCE.

1. Cat
2. House
3. Automobile
4. Phrenologize
5. Coat
6. Marble
7. Dog-flogger
8. Variance
9. Beetle
10. Crayon

Internal Consistency Techniques

The extent to which the items in a test all measure the same thing.

3. Split Half Reliability

1. Divide the test in half into two equal sub-tests.
2. Correlate the scores on the sub-tests.

4. Interrater (Scorer) Reliability

1. Do different scorers give the same evaluation of the same test?
2. Does the same scorer give the same evaluation to the same test?

Important!

Reliability estimates let you know how much error you have in a test score but does not let you know if you are measuring the right thing.

What is It?

Are you measuring what you say you are measuring.

A test may be valid for one application but invalid for an another.
A test's validity is limited by its reliability.

Types We Will Discuss

1. Face validity
2. Content validity
3. Criterion related validity
4. Construct validity

Type 1. Face Validity

The extent to which a test looks like it measures what it says it measures.

Issues

1. Superficial.
2. Because it looks good doesn't mean it is good.
3. Because it looks weird doesn't mean it is weird.

Type 2. Content Validity

Showing that the behaviors sampled by the test are a representative sample of the attribute being measured.

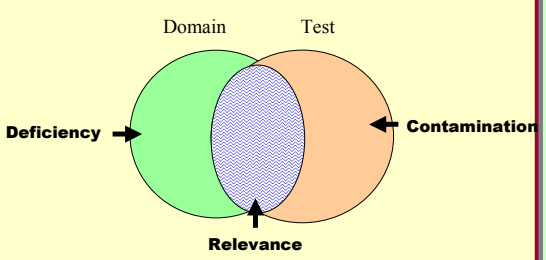
Content Domain to be assessed.

Content Domain of the test.

Basic concepts of reliability as they apply to test evaluation and interpretation of test scores.

Individual test items.

Model

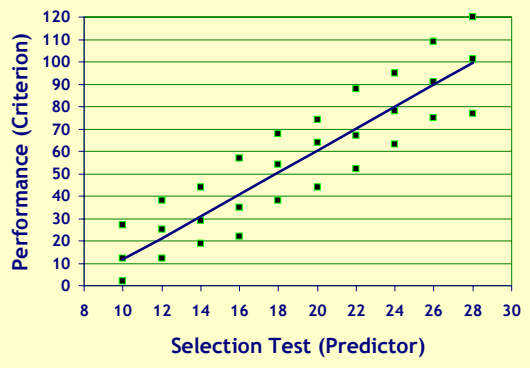


What Good Is It?

Does the test cover a representative sample of the skills, abilities, knowledge, and/or behaviors relevant to the construct being measured?

Type 3. Criterion Related Validity

Criterion	***A measure of the accuracy of a decision or prediction.***
Predictor	***An assessment tool used to estimate a person's behavior.***
Validity Coefficient	***The correlation between test scores (predictor) and the criterion.***



Standardization

- How consistently a test is scored and administered.
  - Administer under identical conditions.
  - Use standard scoring rules.
  - Use objective scoring rules.
- Reference group against which scores are compared.

Issue.

The question as to how good a score is cannot be answered.

Have to know, compared to what?

Types of Tests

Test Format

Individual vs. Group

- Individual
  - Test is administered one-on-one.
- Examples.
  - Employment interview.
  - Medical examination.
  - Some intelligence tests.
- Group
  - Test is administered to many people at once.
- Example.
  - SAT test.
  - College quizzes.

Speed vs. Power

- Speed
  - Test has many simple items
  - There is a very short time to complete them.
  - 90% of the people cannot complete all of the items in the allocated time.
- Power
  - Test has few items.
  - The items become progressively more difficult.
  - 90% of the people cannot complete the most difficult items.

Paper and Pencil vs. Performance

- Paper and pencil.
  - Test is administered on paper.
- Examples.
  - Most college testing.
  - Case studies.
- Performance.
  - Person is asked to demonstrate some skill.
- Example
  - Audition.
  - Athletic evaluation.
  - Driving.

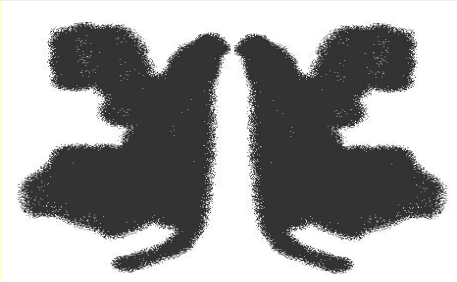
Objective vs. Subjective Scoring

- Objective scoring.
  - Anyone with an answer key can evaluate the answer.
  - Clear right or wrong answer.
- Examples.
  - Multiple choice questions.
  - Mathematics tests.
- Subjective scoring.
  - The evaluation is done by an expert.
  - There are no standard right or wrong answers.
- Examples.
  - Essays.
  - Figure skating.

Projective vs. Objective Items

- Projective
  - Items are ambiguous stimuli that the person is asked to interpret.
- Examples.
  - Rorschach ink blot test.
  - Thematic Apperception Test.
- Objective.
  - Items are clearly stated.
- Examples.
  - True-False items.
  - Multiple choice items.
  - Performance activities.

Typical Ink Blot Item



Types of Tests

Test Content

Ability Tests

- **Tests designed to assess basic intellectual capacity.**
  - **Aptitude test.**
    - **A person's capacity to accomplish intellectual tasks.**
  - **Examples.**
    - **Intelligence tests.**
    - **Creativity Tests.**

Knowledge Tests

- **Tests designed to assess what information a person has acquired.**
  - **Achievement test.**
    - **The information the person has acquired.**
  - **Examples.**
    - **What you have endured in school.**
    - **Graduate Record Examination.**

Personality Tests

- Tests designed to assess an individual's typical behavior or cognitive style.
- Examples.
  - Extroversion
  - Dependability
  - Honesty

Interests Tests

- Tests designed to assess a person's occupational preferences.
  - Used for vocational guidance and job placement.
- Examples.
  - Self-Directed Search.
  - Strong Vocational Interests Blank.

Intelligence

Historical Overview

- **Sir Francis Galton**
  - **British psychologist.**
- **Alfred Binet**
  - **Developed the concept of Mental Age.**
- **Louis Terman**
  - **Translated Binet's test into English.**
  - **Developed the concept of INTELLIGENCE QUOTIENT**

Intelligence Quotient (IQ)

$$IQ = \left(\frac{\text{Mental Age}}{\text{Chronological Age}} \right) x100$$

Mental Age: 14
Chronological Age: 12

$$IQ = \left(\frac{14}{12} \right) \times 100 = 117$$

Mental Age: 14
Chronological Age: 16

$$IQ = \left(\frac{14}{16} \right) \times 100 = 87$$

Distribution of IQ Scores

Retarded	Borderline	Dull Normal	Normal	Bright	Superior	Very Superior
Below 70	70 – 80	80 – 90	90 – 110	110-120	120-130	130 +

What is it?

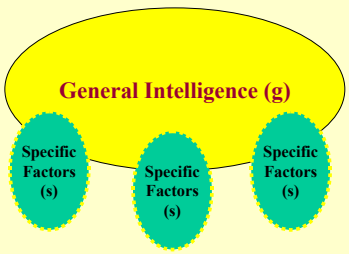
Capacity to deal with new and complex situations.

- A construct, not a thing.
- Not defined in terms of one type of behavior.
- Should be related to success in a variety of cognitively demanding activities.

Early Theories of Intelligence

General Intelligence
vs.
Specific Abilities

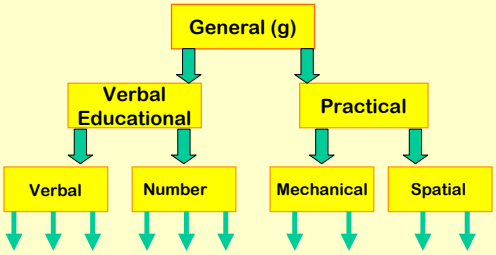
Spearman's *Two Factor Theory*



Thurstone's *Primary Mental Abilities*

1. Verbal Comprehension
2. Word Fluency
3. Numbers
4. Space Visualization
5. Associative Memory
6. Reasoning
7. Perceptual Speed

Vernon's *Hierarchical Model*



Contemporary Theories

Sternberg *Information Processing*

Intelligence is not the things you process, but how you process the things.

Sternberg's Intelligences

1. **COMPONENTIAL INTELLIGENCE**
   The mental processes that underlie thinking and problem solving.
2. **EXPERIENTIAL INTELLIGENCE**
   The capacity to deal with new and routine problems.
3. **CONTEXTUAL INTELLIGENCE**
   Practical problem solving. 'Street Smarts' or common sense.

Gardner's *Multiple Intelligences*

Intelligence is the ability to solve problems and/or to create products which are valued in one or more cultural contexts.

Gardner's Multiple Intelligences

1. Linguistic
2. Logical-Mathematical
3. Spatial
4. Naturalist
5. Musical
6. Bodily Kinesthetic
7. Intrapersonal
8. Interpersonal

Types of Intelligence Tests

- Individual vs. Group
- Speed vs. Power
- Child vs. Adult
- Broad vs. Limited

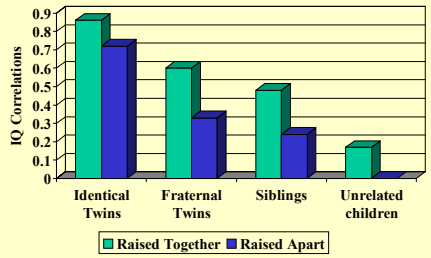
Intelligence Issues and Concerns

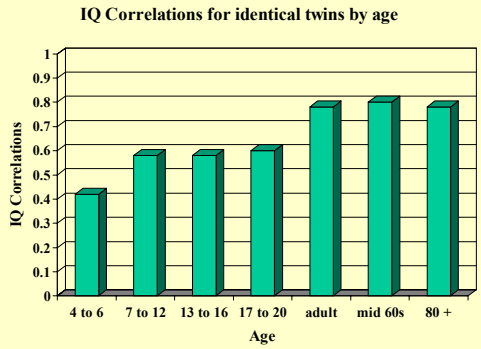
Where Does 'Intelligence' Come From?

- **Heritability**
  - These arguments state that intelligence comes from genetic factors.
- **Environment**
  - These arguments state that intelligence is influenced by environmental factors.

$$B = f(P :: E)$$

Heritability and Intelligence





The Environment and IQ

- The best predictor of a child's IQ is family socioeconomic status and mother's IQ.
- Prenatal conditions.
  - Fetal Alcohol syndrome.
  - Drugs.
  - Diet.
- Head Start
  - IQ increased during initial enrollment.
  - IQ gains reduced after leaving the program.

Issues

- What are we measuring?
- Race, culture, and IQ.