Lecture 07: Psychometrics

Scale Reliability and Validity

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This week

- Social Psychology submission due
- 2 parts to the lab
  - Ethics II - the Goldsmiths Portal
  - Reliability and Validity recap materials

Any Questions?

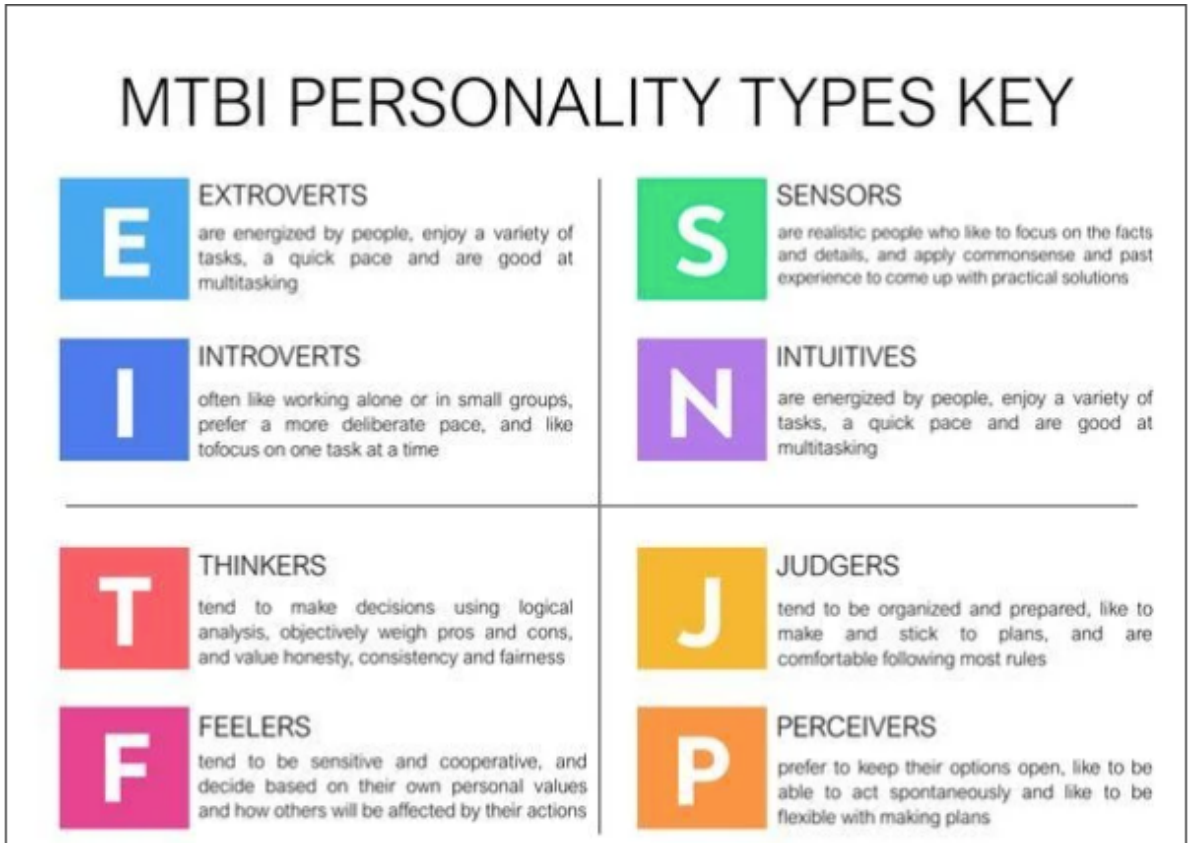
Key topics today

How do we measure or assess psychological concepts and constructs?

Psychometrics; the science of psychological assessment.

General reader: Breakwell, Smith & Wright (2012) – Chapter 7 (available via reading list free online)

What Myers-Briggs type are you?



Myers-Briggs...

– Based on Jung's non-scientific ideas about personality

– The four dimensions are binary. But most characteristics are normally distributed

– Very poor test-retest reliability.

– Almost no research support.

– Company behind the test CPP makes $20 million a year from it. Has little incentive to start from scratch!

https://www.vox.com/2014/7/15/5881947/myersbriggs-personality-test-meaningless

What is psychometrics?

– Meaning from Greek origin: ‘measuring the soul’

– Psychometrics is the field of study concerned with the theory and technique of psychological measurement, which includes the measurement of knowledge, abilities, attitudes, and personality traits

– Refers to all areas of psychology concerned with psychological measurement (methods of testing and substantive findings)

– Two major research tasks:

– (i) the construction of instruments and procedures for measurement;

– (ii) the development and refinement of theoretical approaches to measurement

A brief history of psychometrics

– Charles Darwin’s (1809–1882) Origin of the Species impacts scientific thinking in 19 th century

– Evolution (anthropology) combined with quantification (allure of numbers)

– Francis Galton (1822–1911) builds on cousin Darwin’s ideas with measurement and statistics

A brief history of psychometrics

– Galton developed the theory underpinning correlation and regression

– Used this theory to try to explain the heritability of human ability and achievement (amongst many other things)

– Developed a lab and tests for many concepts e.g. prayer, boredom, beauty

What is a psychometric test?

- Sample of affect, behaviour, cognition etc
- Obtained under standardized conditions
- Scored using rules that provide allow for comparison of individuals
- Ideally, we would like:
  - Multiple samples
  - Multiple situations (contexts, several occasions)
  - Multiple methods

But you can't always get what you want...

Often, must measure individuals on

- One occasion
- Timed/ restricted conditions

So must use efficient methods

- Many opportunities (multiple choice tests)
- Objective scoring (no judgment involved)
- Adaptive item selection

Differences between a psychometric test and a general survey

- Scientific rationale
- Careful item development and test construction
- Objective
- Standardised
- Instructions
- Scoring procedure
- Reliable
- Valid

Clinical uses of psychometric tests

- Describe current functioning
- Further investigate impressions from less formal evaluation approaches
- Identify therapeutic needs
- Aid in differential diagnosis of disorder
- Monitor treatment over time to monitor success and identify new treatment needs
- Provide empathetic feedback

Occupational uses of psychometric tests

- Initial hiring
- Job selection
- Team development
- Career counseling
- Training readiness
- Succession planning
- Performance assessment
- Promotion

Educational uses of psychometric tests

- Counseling
- School exams
- University entrance exams
- Course exams
- Learning disabilities

Types of psychometric tests

Maximum performance test (can do)

- Intelligence tests (basic reasoning ability common to a variety of intellectual tasks)
- Attainment tests (mastery tests, e.g., your exams, certification testing)

Typical performance test (will do)

- Personality tests (ways of thinking, feeling and behaving)
- Careers and interests tests

– Different answer demands: effort versus candid truth

– Context dependent

Examples of maximum performance items (ability)

Odd one out

`Tree, Man, Paper, Mouse`

Next in sequence

`1, 1, 2, 3, 5, 8…`

Spatial reasoning

First 3 form a series,

Which comes next A, B or C ?

Stimulus

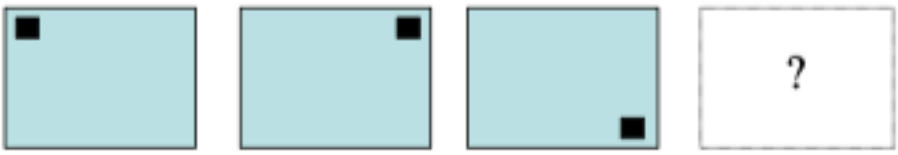
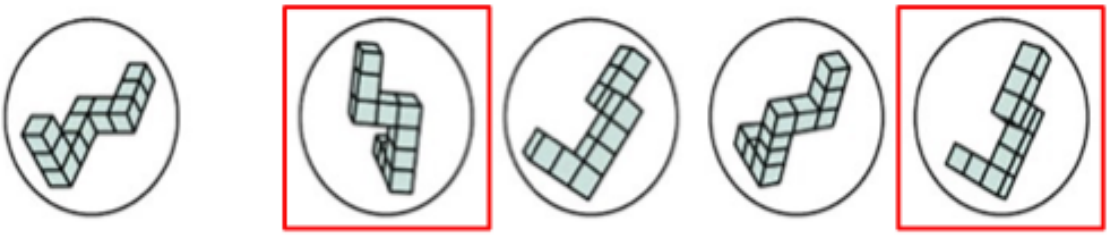


Image rotation task



Examples of typical performance items

Rate on a scale from 1 to 5 how true this is of you

(Costa & McCrae, 1992, Big Five)

`Once I find the right way to do something, I stick to it`

Dichotomous yes/ no answers

(Eysenck & Eysenck, 1976, Giant 3):

`I am the life of a party`

Forced choice

(Zuckerman, 1979, Sensation Seeking Scale)

`A: I like "wild" uninhibited parties`

`B: I prefer quiet parties with good conversation`

Properties of Psychometric tests

Properties of psychometric tests

Two important properties of psychometric tests

Reliability

–The consistency with which a test measures the construct

Validity

–The degree to which a test actually measures what it claims to measure “accuracy”

Essential properties: Validity

A test is valid if it assesses what it claims to measure

The validity of an assessment strategy is the extent to which the strategy yields a reasonably accurate estimation of the characteristic or phenomenon in question.

Many steps to achieve validity (including concurrent validity, predictive validity, construct validity and face validity)

Essential properties: Reliability

Test retest reliability

– Rule of thumb r between the two test times , 3 months apart > 0.7 (just under 50% agreement)

– Test re-test reliability is not perfect – never reaches 1: beware real changes!

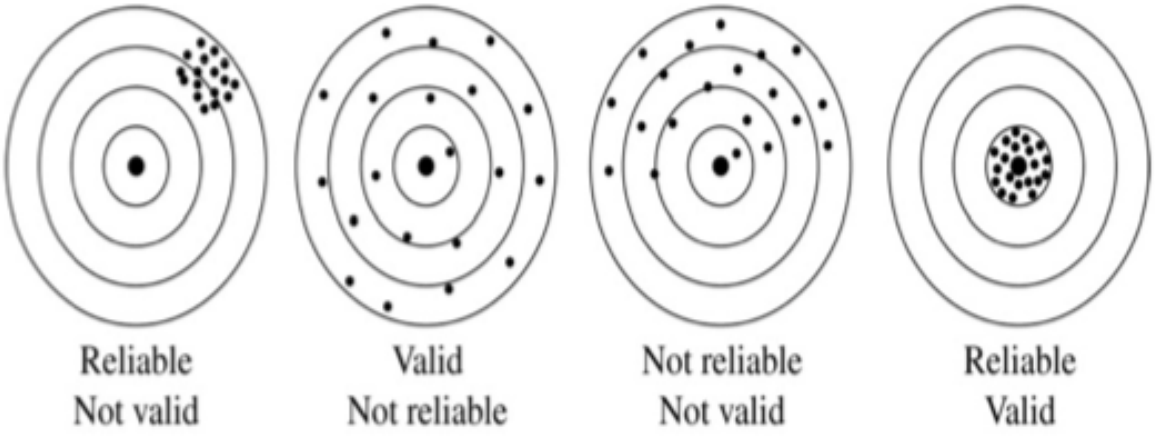
Internal consistency reliability

– Internal consistency is the degree to which all items are measuring the same construct

– Cronbach's Alpha should be greater than .70 for scales with items > 10

Reliability and Validity

I like to think of them as Consistency and Accuracy



Different types of tests - raters

Behavioral observation (observer-rated)

– People scored according to behaviors observed by a rater

– Used frequently in work and clinical settings (e.g. Performance appraisal)

Self-report

– Subjects indicate their level of agreement or preference concerning statements reflecting attitudes or behaviors

– Response distortion is a problem (e.g. faking a personality test)

Standardizing psychometric test scores

The raw score on many psychometric tests is based on an arbitrary scale

To give the scores meaning, we compare a person's scores to a meaningful comparison group

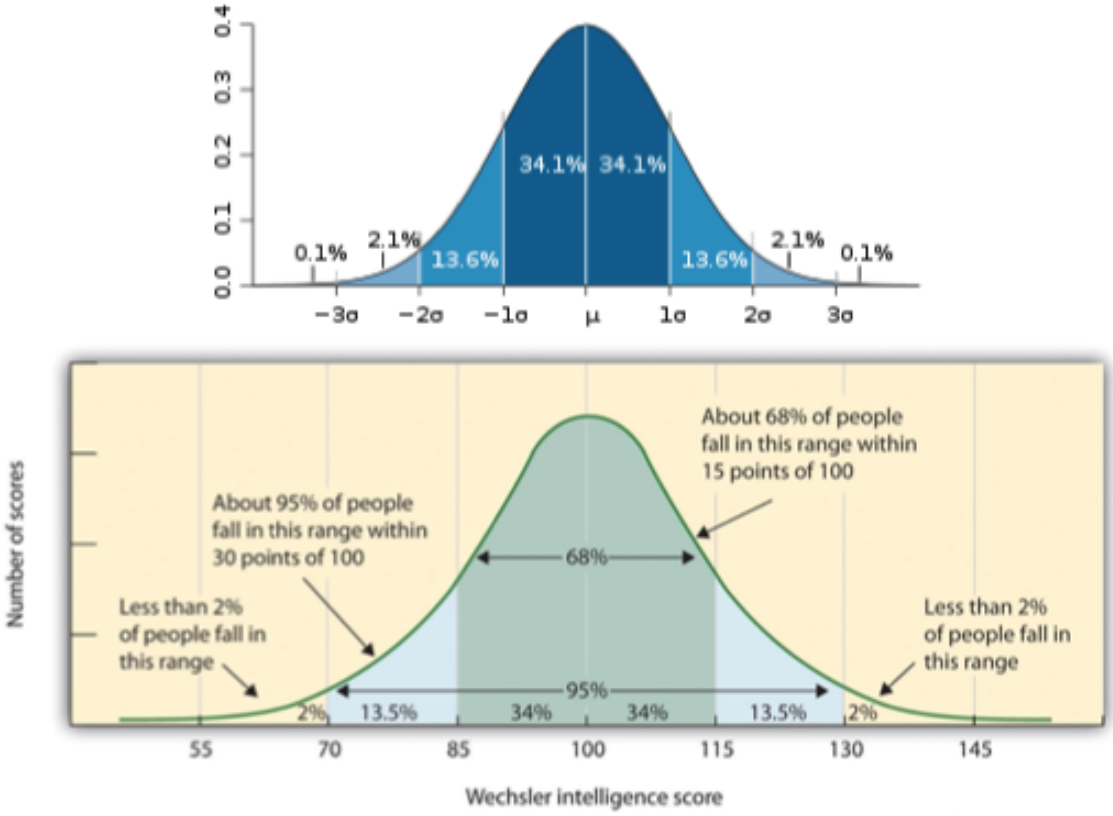
Statistical basis: Normal distribution

Most human traits approximate to normal curve

–Largest number of cases cluster in centre

–Area under curve can be closely specified from mean and standard

Intelligence



Next week...

We might go about developing our own Psychometric Test.. if you want.

References