Selecting future doctors

An overview
and an evidence based model for selection

David Powis, Miles Bore, Don Munro
Newcastle Innovation

Summary

- there should be more emphasis on identifying the potentially inadequate
- use well-researched and validated measures
  - personality tests have a valuable role to play
- apply a sequential filtering model
  - bulk screening through to individual assessment
- reserve interview for doing what it can do uniquely well

What do we know about doctors?

most are adequate,

but some

- **don't communicate appropriately**
  - junior colleagues, peers, patients, patients' families

- **behave unethically / unprofessionally**
  - attract complaints and litigation
    (53 per '000 insured doctors; Australia 2000 – 2004)
  - attract notoriety
    (e.g.Dr Shipman, Dr Martin in UK; Dr Patel, Dr Reeves in Australia)

- **have high prevalence of depression, anxiety**
  - 37% of primary care physicians
    high levels of ‘psychological discomfort’
    associated with practice (Spain)
  - 1 in 5 hospital doctors (UK survey)
    symptoms of ‘**such severe depression and anxiety** that they warranted psychiatric care, had it been sought’

- **high incidence of substance abuse**
  - 1 in 15 doctors become dependent on alcohol or drugs during career (UK, GMC, 2005)
  - 1400 doctors disciplined for substance abuse (USA 1999 – 2004)

- **high suicide rate**
  - male doctors 1.4 X general population
  - female doctors 2.3 X general population

(meta-analysis of studies of physician suicide rates
Schernhammer & Colditz, *Am J Psychiatry* 161, 2004)

- **high levels of burnout / distress**
  - stressful work environment
  - long hours
  - conflict between work and personal life
  - individual psychological vulnerability

See Willcock *et al., MJA*, 181, 2004, 357 - 360

What do we know about medical students?

most are adequate,

but some cause concern

– one UK medical school identified 10 – 15% of each intake (over 5 years) as ‘strugglers’

J Yates & D James, *BMJ* 332 (2006) 1009-1013

– medical school teachers have all observed ‘unsuitable’ individuals

A survey of professionals

clinical staff asked to list undesirable personal characteristics they ***had observed*** in medical students (and colleagues)

(n = 190 respondents; Newcastle)

their descriptors of inappropriate medical student behaviours and attitudes:

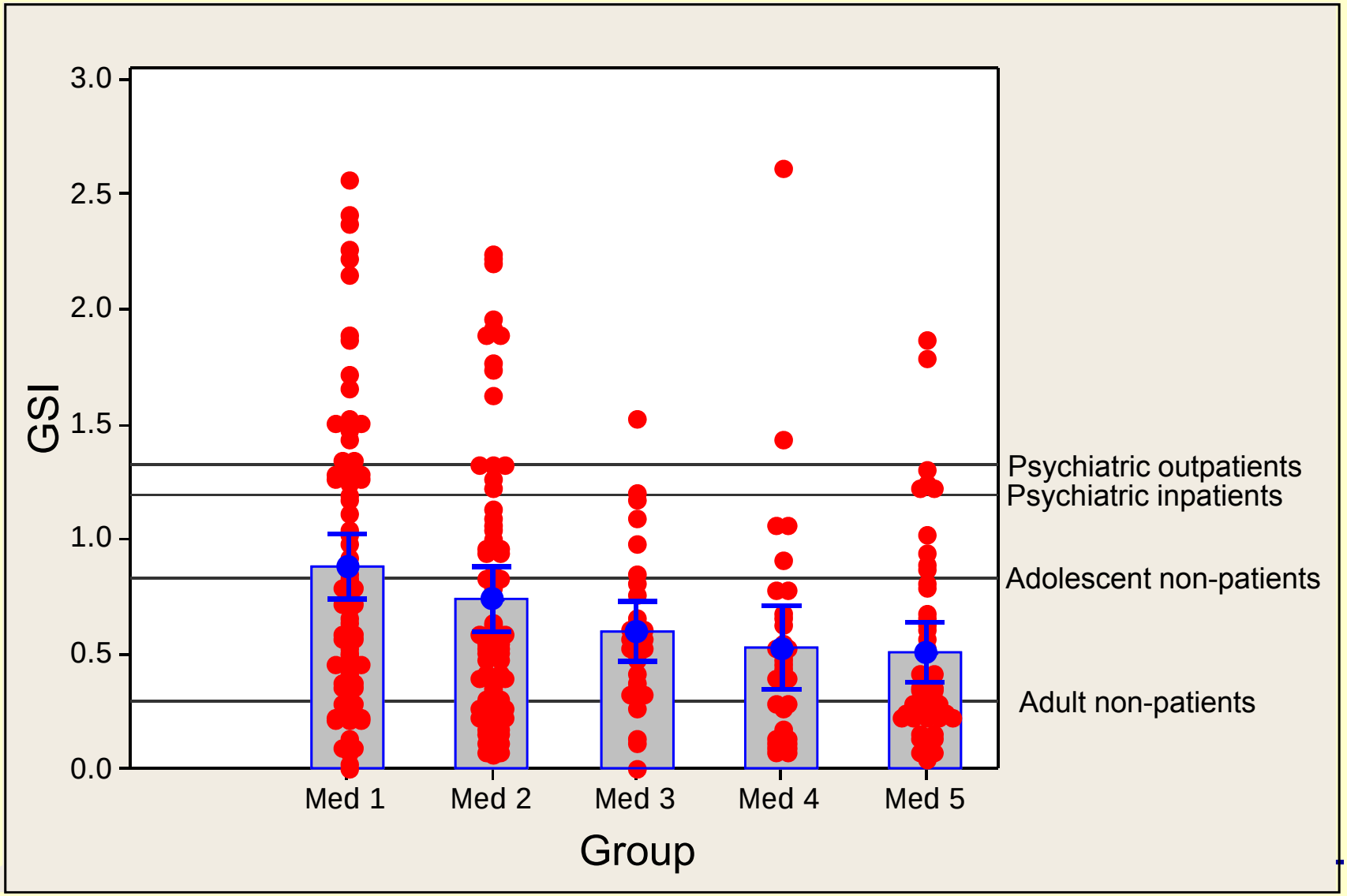
- arrogant
- power-seeking
- inflexible
- defensive
- dishonest
- patronising
- brash
- egocentric
- isolated
- insensitive
- self-centred
- uncaring
- indifferent
- selfish
- antisocial
- amoral
- devious
- prejudiced
- flippant
- rude
- aggressive
- condescending
- rigid attitudes
- judgemental

Lowe et al. *J med ethics* **27** (2001) 404-408

Problems observed in medical students

- **high prevalence of psychiatric morbidity**
  - 26% in final year of one Australian medical school
  - 30% of 1st and 2nd year medical students suffered high levels of emotional distress (Spain)
  - 31% of 1st year medical students at Newcastle had symptom level score on Brief Symptom Inventory ≥ BSI norm for adult psychiatric in-patients

Global Severity Index compared to BSI norms



Why might this be the case?

- ? undue focus on positive attributes of applicants during selection
- and failure to adequately consider the warning signs

Selection procedures

most procedures are focused on seeking the

- highest academic achievers
- best cognitive skills
- and (maybe) best communication skills etc

'the brightest and best', 'the cream of the cream'

Nothing wrong with this, except

perhaps **the emphasis…**

– concentrating on trying to discriminate

the ‘best’ from

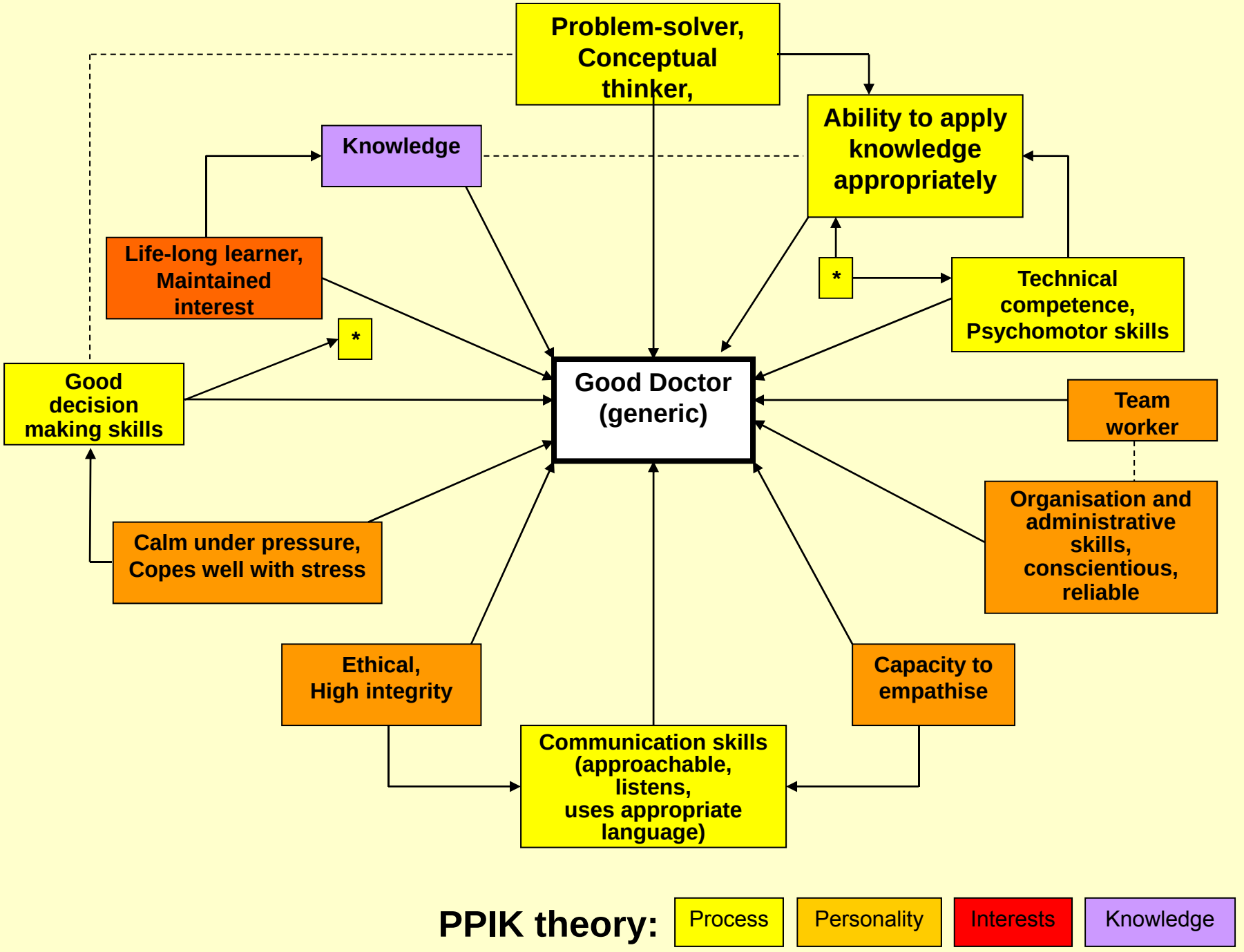
the ‘next best’ from

‘above average’ etc

is wasted effort if most students will be just fine

– should we expend more effort trying to identify the potentially inadequate?

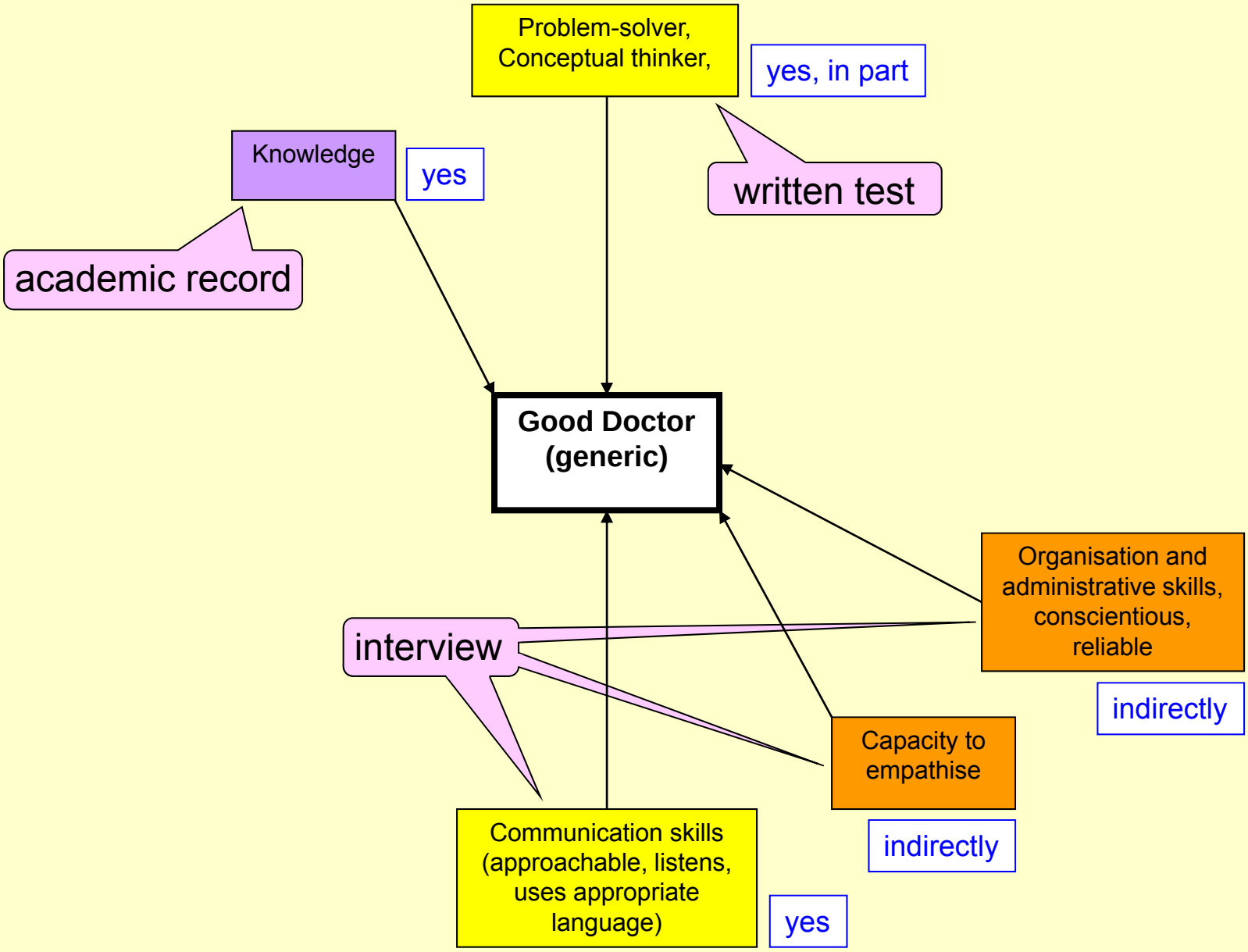
What is a good doctor?


Problem-solver, Conceptual thinker,
Ability to apply knowledge appropriately
Knowledge
Life-long learner, Maintained interest
*
Technical competence, Psychomotor skills
*
Good decision making skills
Good Doctor (generic)
Team worker
Organisation and administrative skills, conscientious, reliable
Calm under pressure, Copes well with stress
Ethical, High integrity
Capacity to empathise
Communication skills (approachable, listens, uses appropriate language)
PPIK theory:
Process
Personality
Interests
Knowledge

Which of these do

current selection procedures

look for?


Problem-solver, Conceptual thinker,
yes, in part
written test
Knowledge
yes
academic record
Good Doctor (generic)
Organisation and administrative skills, conscientious, reliable
indirectly
interview
Capacity to empathise
indirectly
Communication skills (approachable, listens, uses appropriate language)
yes

Tests used in Australia

UMAT

- logical reasoning & problem solving
- ‘understanding people’
- non-verbal (spatial) reasoning

GAMSAT

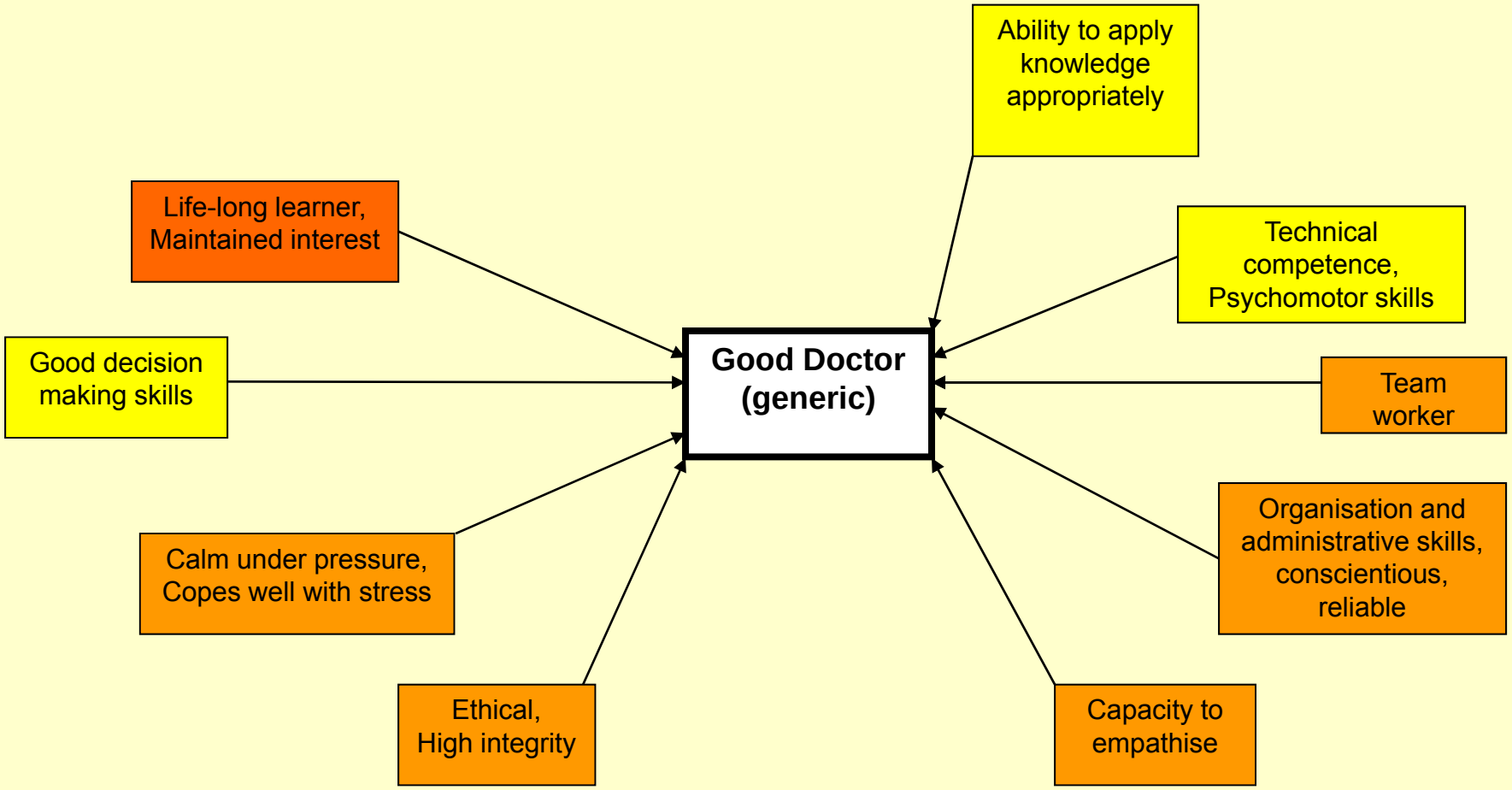
- reasoning in physical and biological sciences
- reasoning in the humanities
- creative writing

Tests used in UK

UKCAT

- decision analysis
- abstract reasoning
- verbal reasoning
- quantitative reasoning

Existing tests **DO NOT** measure:



How useful are they?

outcome studies disappointing

- **UMAT -** no published studies
  informal reports only
  no correlation with
  medical school assessment measures
- **GAMSAT -** 2 published studies
  no correlation with
  medical school assessment measures

Interviews

most medical schools interview;

some in Australia have abandoned or downgraded the interview

- only 1 study has shown interview scores predict medical school outcome (Newcastle 1988)
  - 'withdrawal/exclusion' *vs* 'graduation with honours'
- other studies have shown modest correlations with clinical assessment

The *Personal Qualities Assessment*

PQA

PQA research base

Extensive research studies over 12 years

- > 28,000 individuals
- England, Scotland, Australia, Israel, Sweden, Japan, Taiwan, Hong Kong, Fiji, Canada

Established

- high reliability of all subtests
- construct validity

What are the tests?

PQA

Test 1 Mental Agility Test

high level cognitive skills

Test 2 'Mojac' Questionnaire

balancing individuals' freedoms with society's rules

Test 3 NACE Questionnaire

emotional involvement versus detachment

Test 4 Personal Characteristics Inventory

self-control and resilience

PQA Mental Agility Test (MAT)

A **general** cognitive skills test of high difficulty

1 hour; 45 items; MCQ format

- verbal
- numerical
- spatial

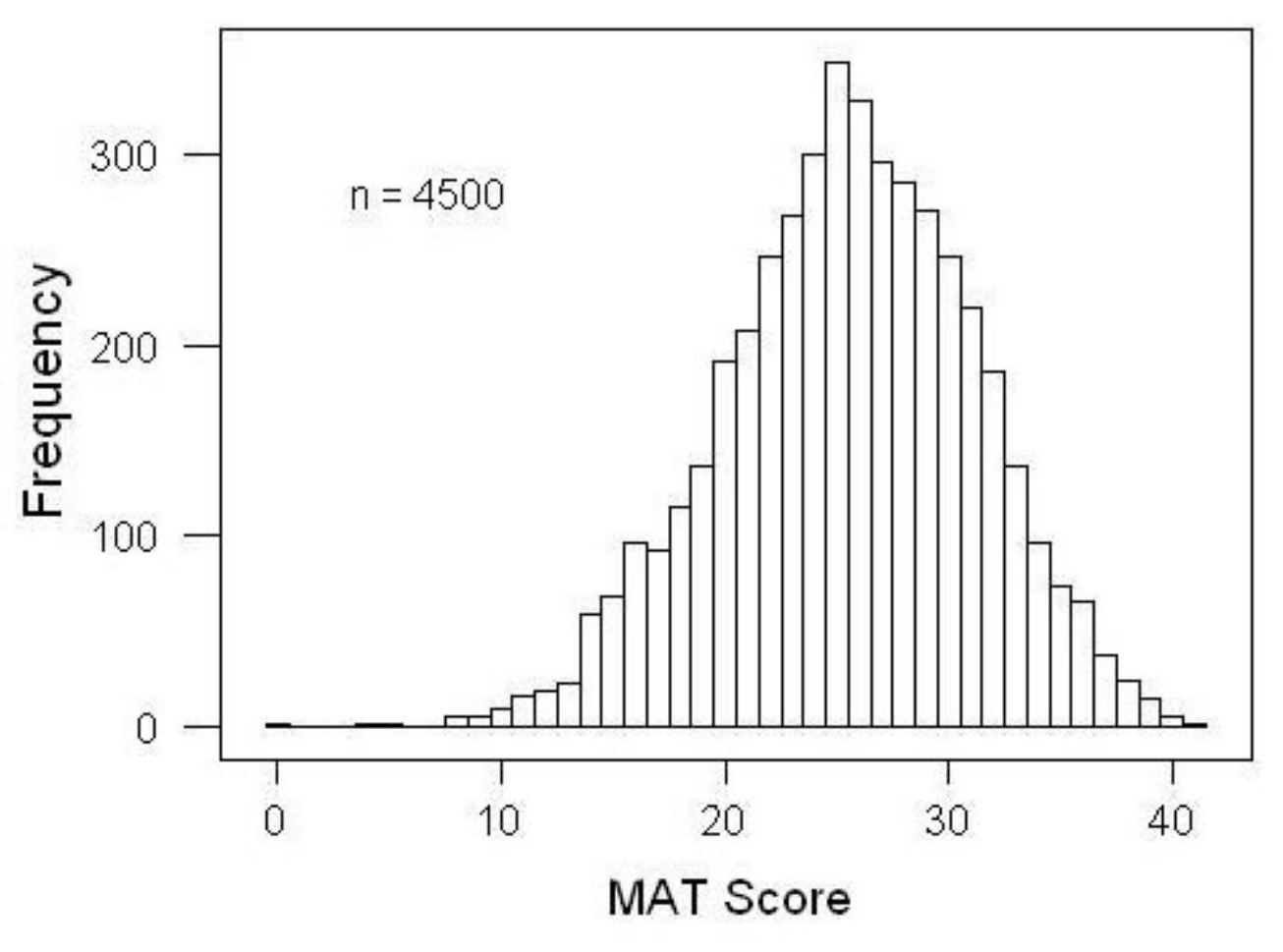
General Cognitive Ability (GCA)

- **moderate to strong predictor of occupational attainment and performance within occupations***

*Schmidt FL, Hunter J. General mental ability in the world of work: Occupational attainment and job performance. *J Pers & Soc Psych*, 2004; **86**; 162-73.

*Brown KG, Le H, Schmidt FL. Specific aptitude theory revisited: Is there incremental validity for training performance? *Int J Selection and Assessment* 2006; **14**: 87-100.

PQA MAT score distribution



45 items; mean score 25.5 ± 5.6 S.D; range 0 - 41

PQA MAT reliability

Good internal consistency:

Cronbach's alpha 0.73

PQA 'Mojac' questionnaire

a series of moral dilemmas requiring balancing individual freedoms against society's rules

- 49 items; approx. 30min
- a dissonance model of ethical decision making

Bore, 2001; Bore *et al*., 2005

‘Ethics’ – nurture or nature?

- knowledge
- attitudes and values
- sensitivity
- reasoning
- intrinsic orientation
- decision making style
- behaviour

‘Ethics’ – nurture or nature

- knowledge
- attitudes and values
- sensitivity
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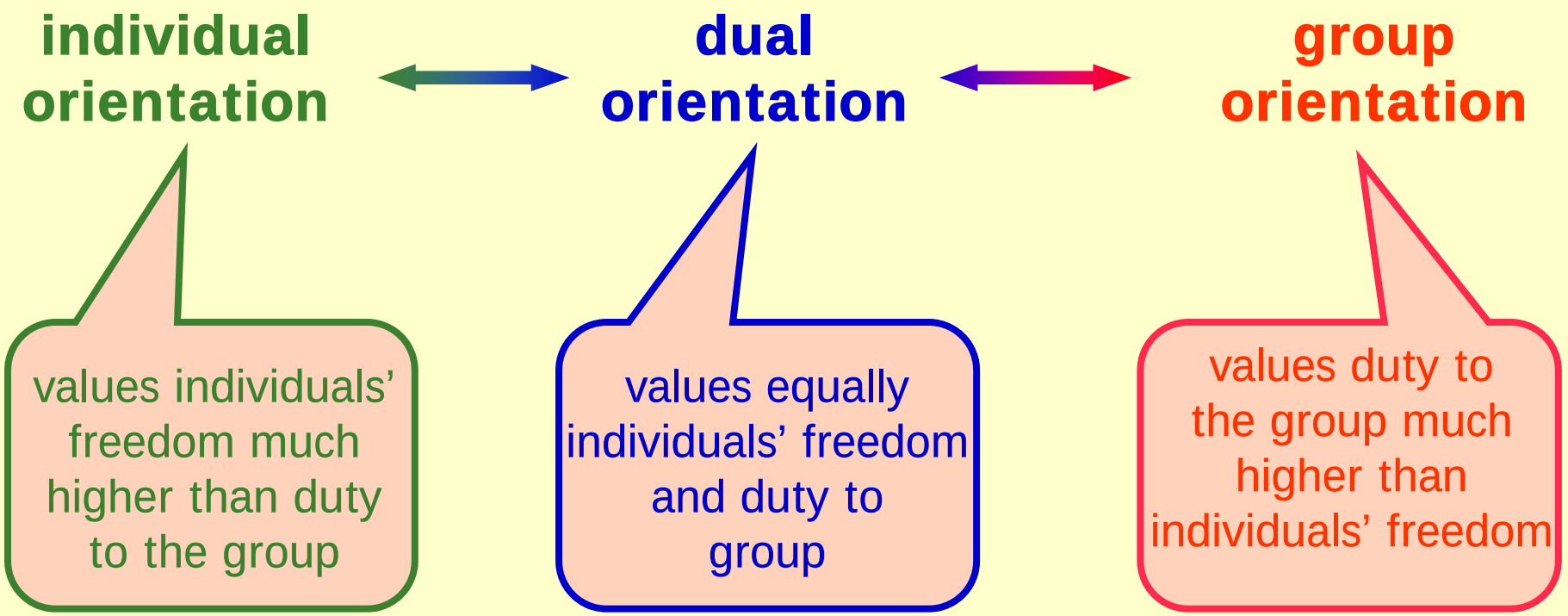
learned on course

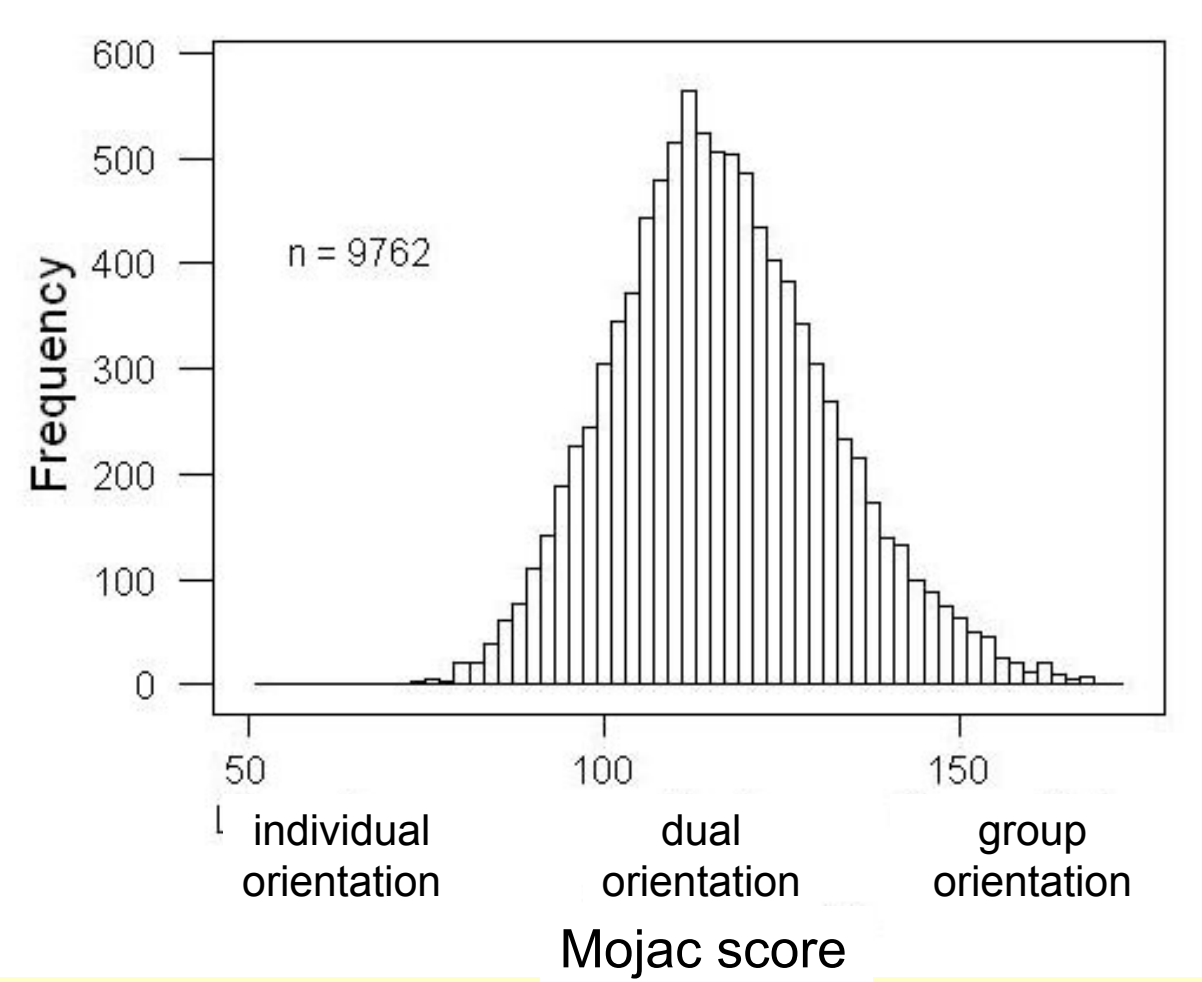
measured by Mojac

desired outcome

‘Mojac’: individuals’ freedom in the context of society’s rules



'Mojac': distribution of scores



PQA

'Mojac'

18,000+ individuals tested

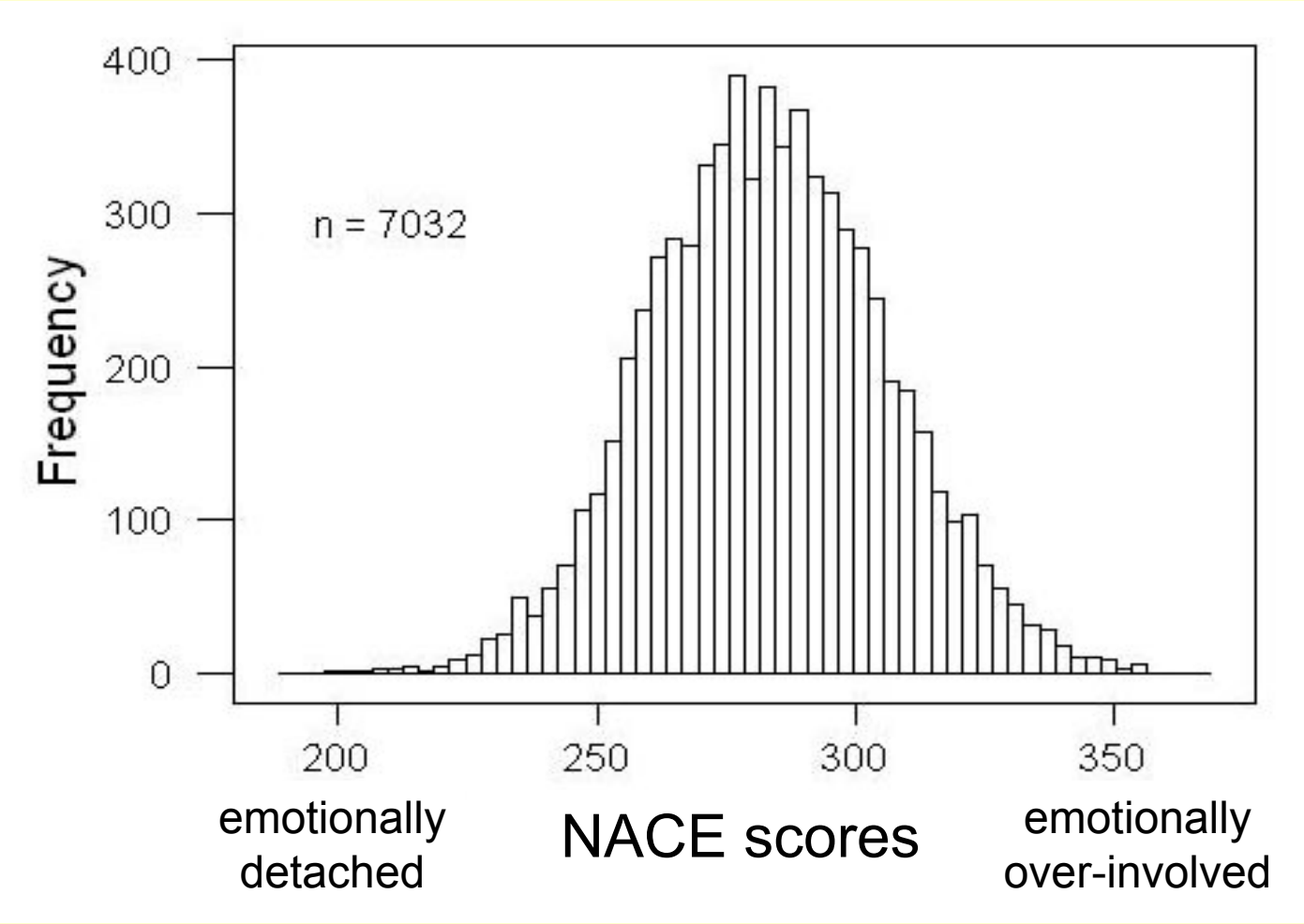
- gender differences
- age effects
- effects of socio-economic status
- effects of ethnic background and culture
  Australia UK Sweden Japan Singapore HK Taiwan Israel
- stable cohort mean score during medical education

PQA
NACE Questionnaire

- 100 item personality inventory (Munro *et al.* 2005)
- approx. 30 minutes to complete
- factor analysis indicates 4 factors
- factors condense to two pairs on a continuum:

Involved with others* vs *Detached from others

NACE


400
300
200
100
0
Frequency
n = 7032
200
250
300
350
emotionally detached
NACE scores
emotionally over-involved

PQA NACE Questionnaire

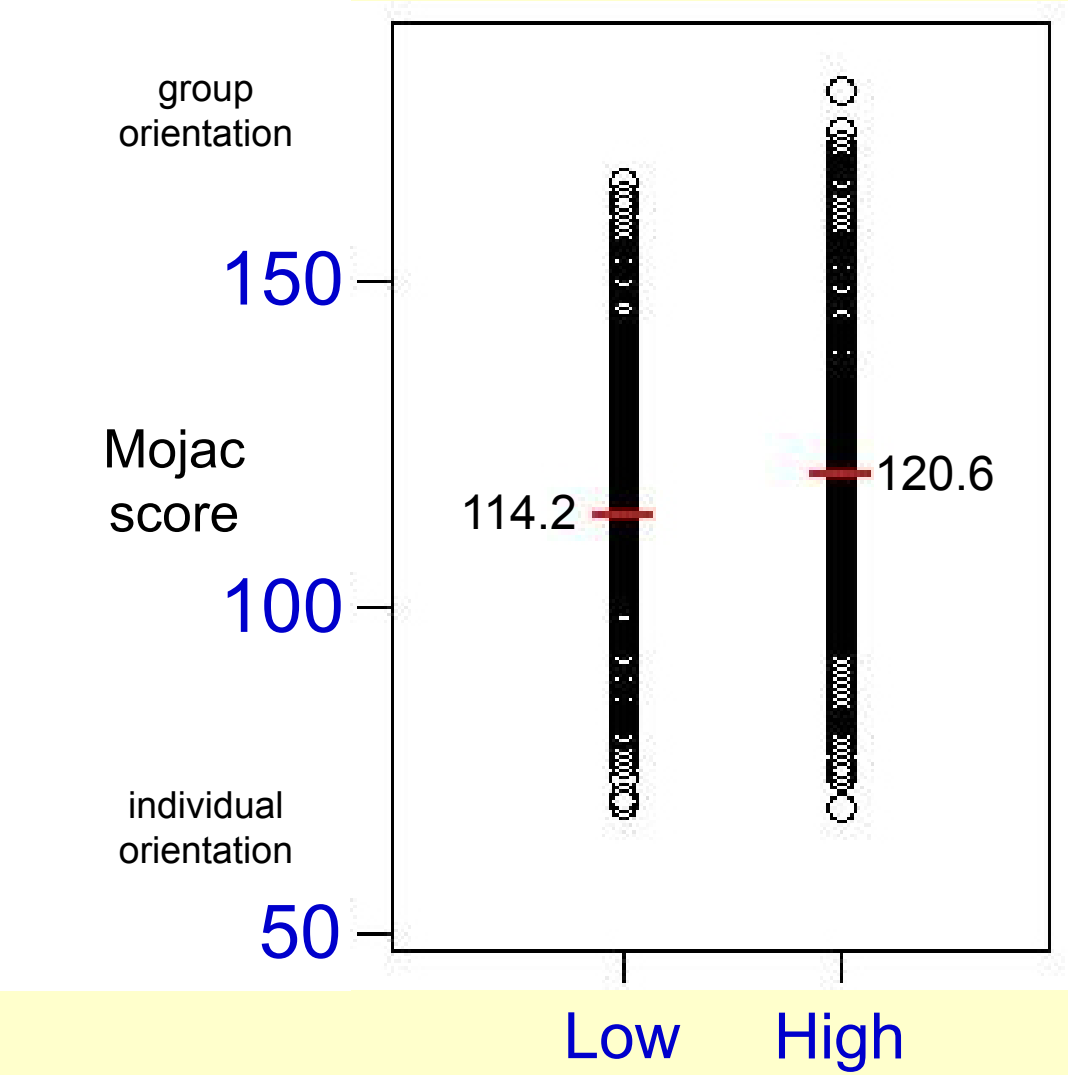
Data on 20,000+ individuals

- gender differences
- age effects
- effects of socio-economic status
- effects of ethnic background and culture
- stable cohort mean score during medical education

Mojac and NACE are reliable

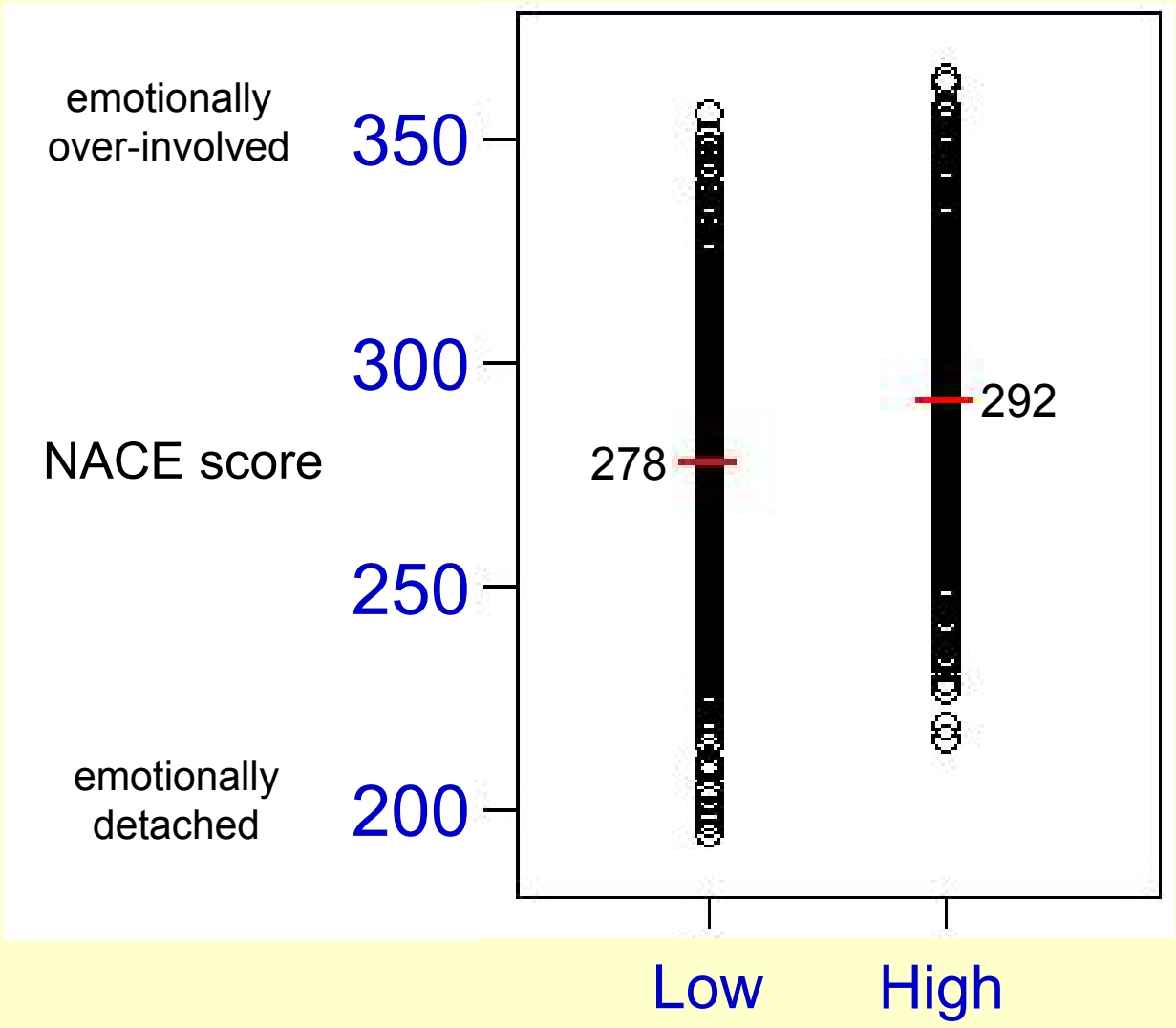
- high internal consistency
  (Cronbach alpha reliability coefficients >.9)
- test-retest reliability (over time) satisfactory
- no (subjective) rater judgements used
- discriminate well within cohorts
- difficult to fake ‘good’ in either test

Mojac



N = 4412 4668

NACE


emotionally
over-involved
350
300
NACE score
250
emotionally
detached
200
278
292
Low
High
N =
4267
4570

Do the tests have construct validity?

do they measure what purport to measure?

Construct validity of Mojac and NACE

- Correlate with other standard measures as expected from theoretical model
  - 16PF modified (Cattell, 1998)
  - IPIP Five-Factor Test - ‘Big 5’ (Goldberg, 1999)
  - Right Wing Authoritarianism (Altemeyer, 1982)
  - Emotional Intelligence (Schutte *et al.* 1998)
  - Eysenck Personality Questionnaire (Eysenck, 1985)
  - Depression, Anxiety & Stress Scales (Lovibond, 1995) [modified]
  - Horney-Coolidge Type Indicator (Coolidge, 2001)

PQA
Personal Characteristics Inventory

- discussion with interested parties indicated need for a test of '*integrity*' and '*mental robustness*'
  - personality trait correlates
    - Conscientiousness / Self-Control
    - Emotional Stability / Resilience
    - Agreeableness / Involvement

- these traits good predictors of general workplace outcomes

PQA
Personal Characteristics Inventory

PCI designed to measure

- **Self-Control** (vs Disorderliness)
- **Resilience** (vs Emotional Reactivity)
- **Lie Scale**

Questions derived from other published instruments used in PQA validity research, e.g.,

- Self-Control Scale (Tangney *et al*. 2004)
- IPIP Five-Factor Test (Goldberg, 1999)
- Brief Symptom Inventory (Derogatis *et al.*1982)
- 16PF (Cattell, 1994 edition)
- EPQ (Eysenck, 1976)

PCI research

- samples of Psychology and Medicine students at three Australian universities
- internal consistency (reliability) (n = 605)
  - Self-Control α = .85
  - Resilience α = .89
- rest-retest reliability (9 months, n = 54)
  - Self-Control r = .74
  - Resilience r = .74

PCI construct validity

- Correlates of PCI Self-Control
  - IPIP Conscientiousness .51
  - Tangney Self-Control .63
  - 16PF Rule-Consciousness .52
  - 16PF Perfectionism .60
  - 16PF Self-Control .74
- Correlates of PCI Resilience
  - IPIP Neuroticism -.66

PQA research base

Extensive research studies over 12 years

- > 28,000 individuals
- England, Scotland, Australia, Israel, Sweden, Japan, Taiwan, Hong Kong, Fiji, Canada

Established

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Predictive Validity?

PQA

- not widely used for selection, **hence** has greater power to predict student outcomes than UMAT or GAMSAT, because initial data not restricted in range

- with some exceptions still no large correlation between any of the tests and most medical school student outcomes

predictive validity

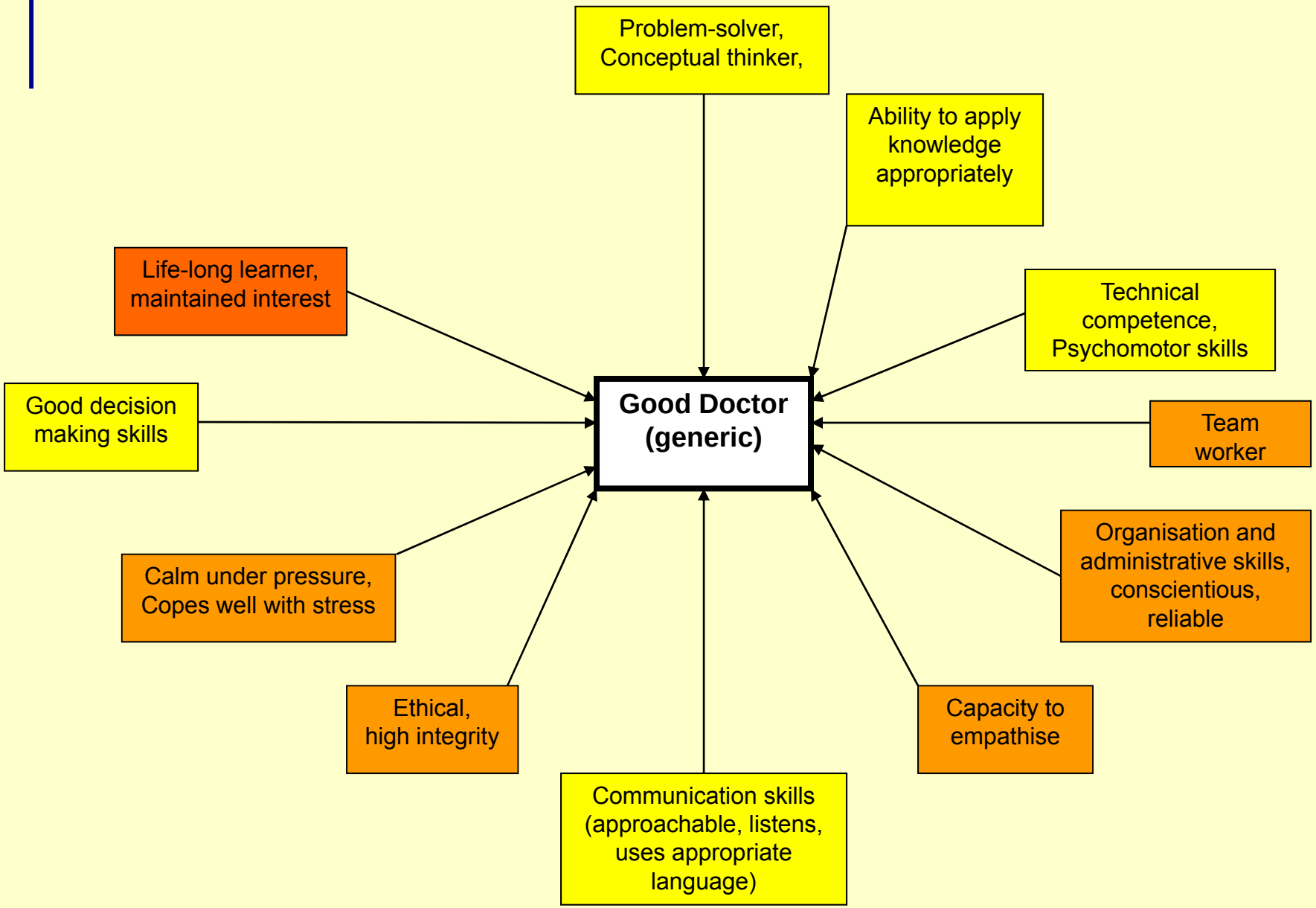
- of tests, including PQA
- and interviews
- has not been decisively demonstrated

What can we conclude?

- perhaps that medical schools are failing to assess in program outcomes the specific qualities and behaviours measured by selection tests and interviews

Implication of assessment failure

- medical schools may be graduating doctors deficient in the generally agreed important qualities tests and interviews are designed to measure


Problem-solver, Conceptual thinker,
Ability to apply knowledge appropriately
Life-long learner, maintained interest
Technical competence, Psychomotor skills
Good decision making skills
Good Doctor (generic)
Team worker
Organisation and administrative skills, conscientious, reliable
Calm under pressure, Copes well with stress
Ethical, high integrity
Capacity to empathise
Communication skills (approachable, listens, uses appropriate language)

Some positive exceptions

PQA predicts 'clinical interview' scores

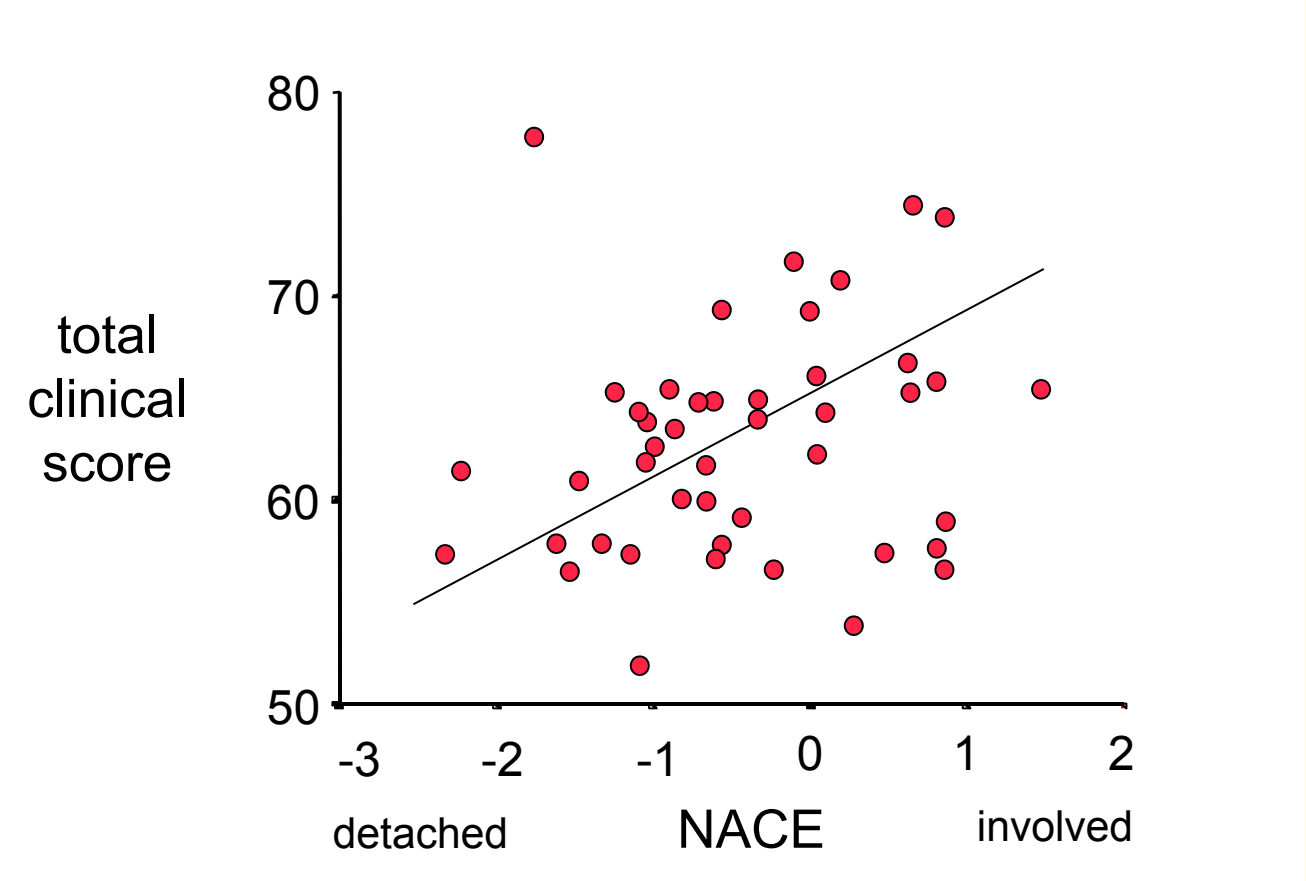
- medical students trained in clinical interview
- then video recorded
- videos scored objectively

Good interview performers - higher NACE scores
(t = 2.5, p = .02)

Poor interview performers - lower NACE scores
(t = 2.7, p = .01)

PQA predicts Final BMBS score

- those who are ‘more involved’ do better



PQA and job satisfaction in GPs

high scorers for

Neuroticism (vs *Emotional Stability*)

found their job

- more demanding (r = .31, p < .05)
- more stressful (r = .35, p < .01)

(N = 57 GP volunteers)

PQA Final year pharmacy students

predicted performance on communications skills tasks

- ability to handle 'difficult customer'
  - correlated with *Confidence* (r = .556)
  - negatively correlated with *Aloofness* (r = -.479)
- clinical scenario viva
  - correlated with *Confidence* (r = .434)
- simulated patient seeking advice
  - correlated with *Confidence* (r = .458)

(n = 28)

A UK medical school year 1 students, 2007-2008

- 143 newly enrolled medical students at a UK Medical School
  - completed PCI, Mojac and NACE
  - were appraised by tutors at twice weekly PBL sessions and during personal mentoring throughout year
  - at end of year sat for summative examinations

- tutor appraisal
  - attends punctually
  - treats tutors with appropriate respect
  - demonstrates appropriate attitude
  - completes given tasks on time
  - integrates themselves into group
  - takes responsibility for group learning
  - contributes work for the group
  - treats peers with respect
  - listens effectively
  - willing to learn from others
  - undertakes PBL role appropriately
  - communicates appropriately with peers
  - communicates appropriately with tutors
  - manages conflict appropriately

- end of year examinations
  - Theme A: life sciences; clinical sciences
  - Theme B: clinical techniques and skills; person-centred care
    - OSCE stations: communication skills (7)
    - OSCE stations: practical skills (7)
  - Theme C: evidence-based decision making; population health & medicine; managing resources

significant correlations ($p < 0.05$)

non-cognitive measure	tutor rating	OSCE practical skills	OSCE communication skills	examination theme	distinguishes top 20% from bottom 20% of exam achievers
self-control	appropriate attitude + completes tasks on time + listens effectively +				
impulsive	completes tasks on time – listens effectively -				
permissiveness	listens effectively -		all -		
anti-social tendencies	manages conflict appropriately -				
moodiness					
conscientiousness					
neuroticism					
unreal thoughts			all –		
lie scale				Theme B –	
narcissism	manages conflict appropriately -				p = 0.025
aloofness	manages conflict appropriately -			Theme A –, Theme B –	p = 0.001
confidence	contributes work to group + treats peers with respect – listens effectively – manages conflict appropriately -	all +	all +	Theme A +, Theme B +	p = 0.001
empathy	manages conflict appropriately -			Theme C +	
ECAN				Theme B +	p = 0.005
social responsibility	attends punctually + treats peers with respect +			Theme B +, Theme C +	p = 0.004

SAI — ITP — IVP

Conclusion

- ***PQA*** does appear to be measuring qualities that predict actual behaviours