
Selecting Medical Students: an unresolved challenge

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Australia

“The recent reports...have drawn attention to some of the problems connected with the selection of medical students...

[and] point out the problems, without discussing ways and means of solving them.”

DH Smyth, *British Medical Journal*, 14 Sep 1946

Medical Student Selection in the UK

“Why aren’t they choosing the right candidates for medicine?”

LB Lockhart

The Lancet 1 (1981) 546-548

“For some time there has been dissatisfaction over the way medical students are believed to be selected, and much inconclusive discussion continues.”

Editorial

The Lancet, 24 September 1984

Medical Student Selection in Australia

“Although mounting criticism and concern are expressed for the manner in which our medical students are selected, the *status quo* continues.”

EF Campbell *et al.*
Medical Journal of Australia
1 (1974) 785-788

What was the *status quo*?

- ❑ high academic marks

- ❑ sometimes tempered by

 - ‘other qualities’ assessed by interview

Medical Student Selection in Australia

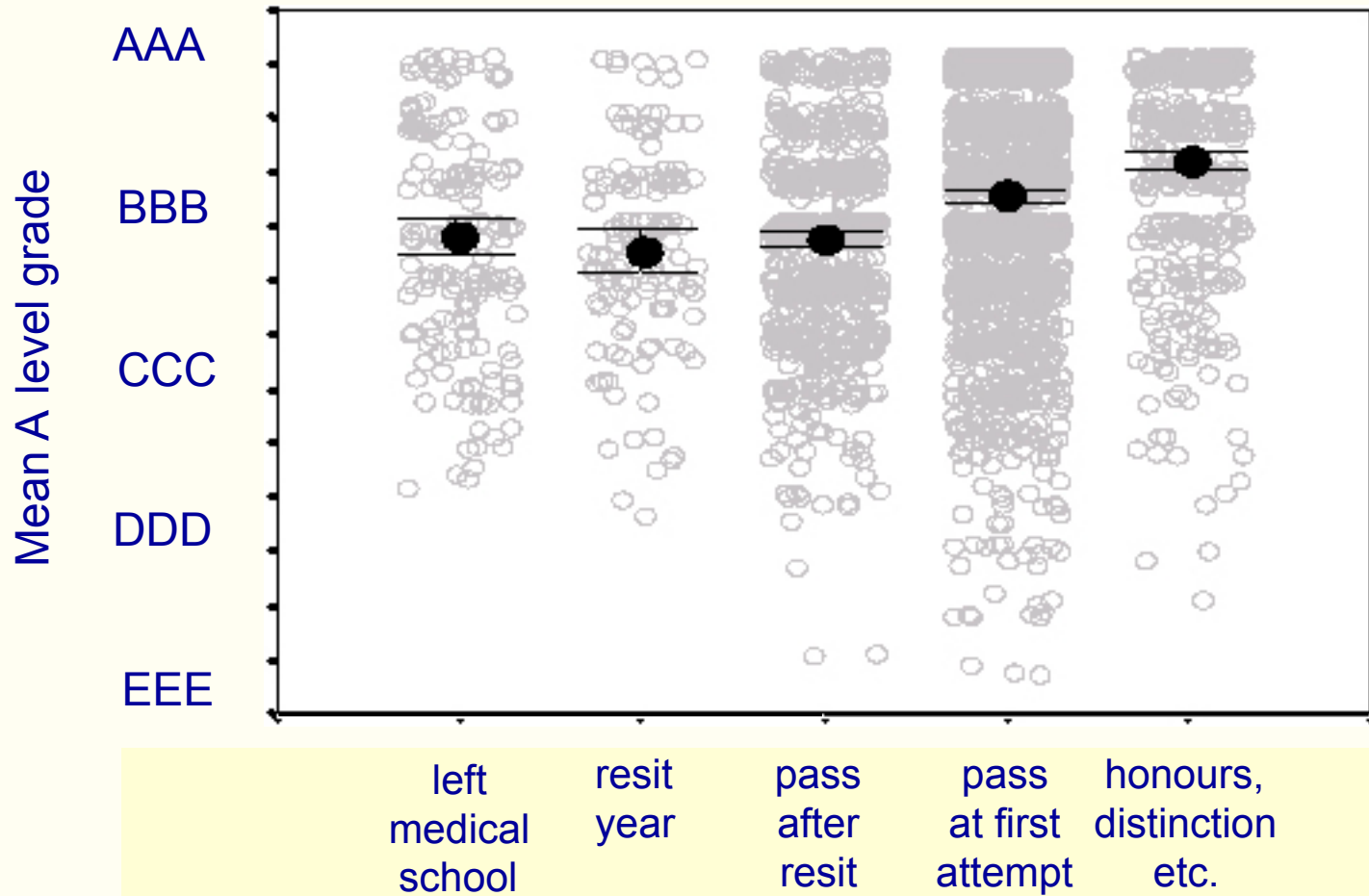
“nobody has any other solution which is strong enough to combat.....the ‘high enough mark method’.”

J Best

Medical Journal of Australia

150 (1989) 158-161

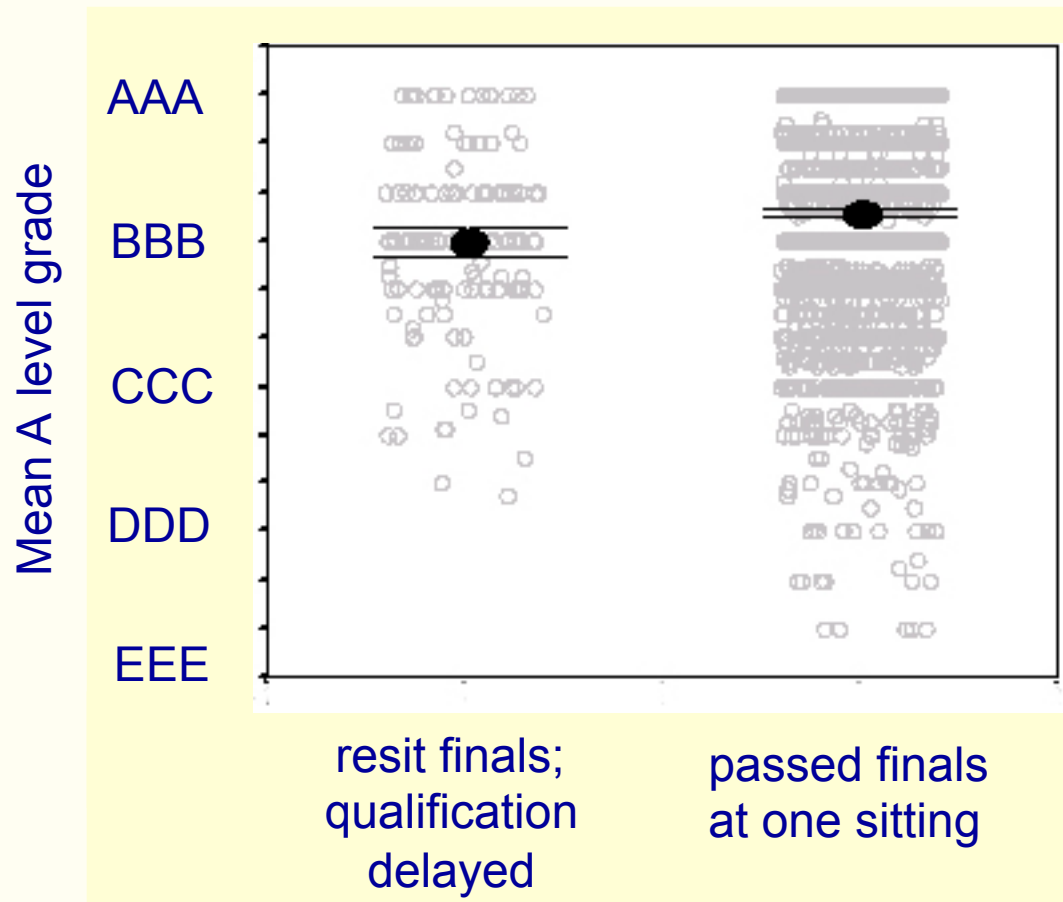
Achievement in relation to A level score



n = 3333

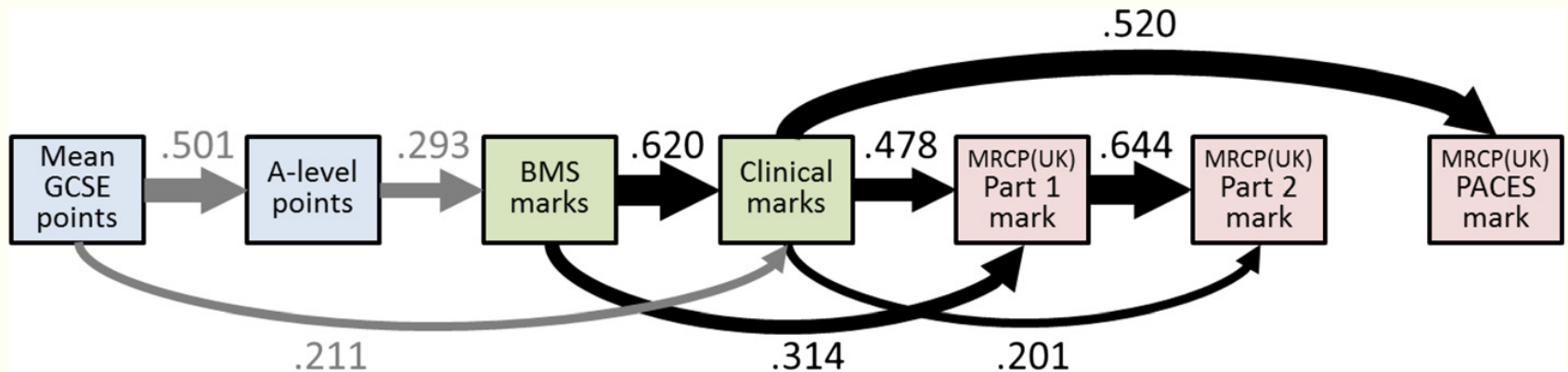
Basic Medical Sciences examinations

Achievement in relation to A level score



Achievement in relation to A level score

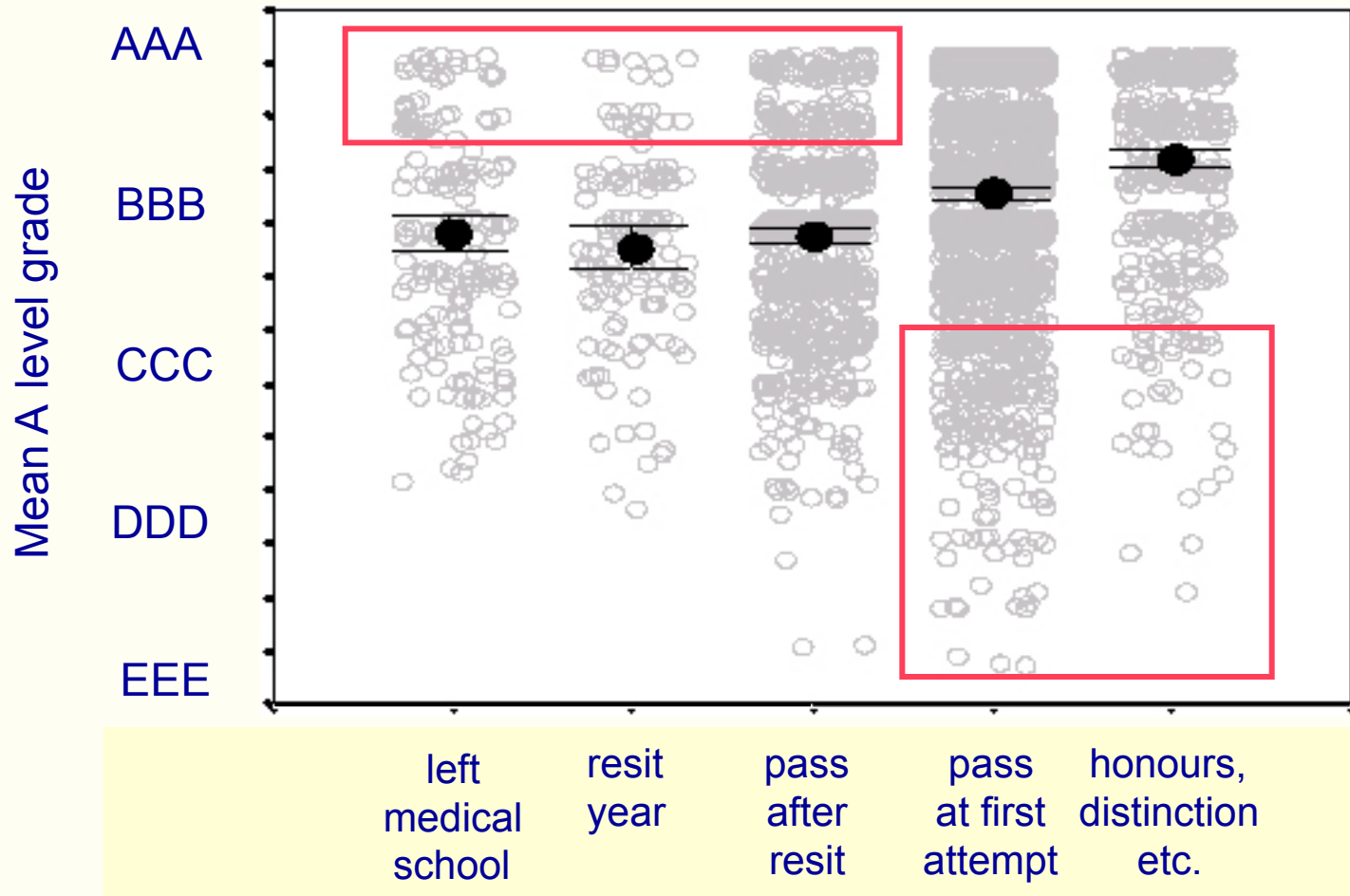
□ The Academic Backbone, medical school and beyond



Academic scores account for

- ❑ 23% of the variance of progress measures at medical school,
- ❑ ...and 6% beyond medical school

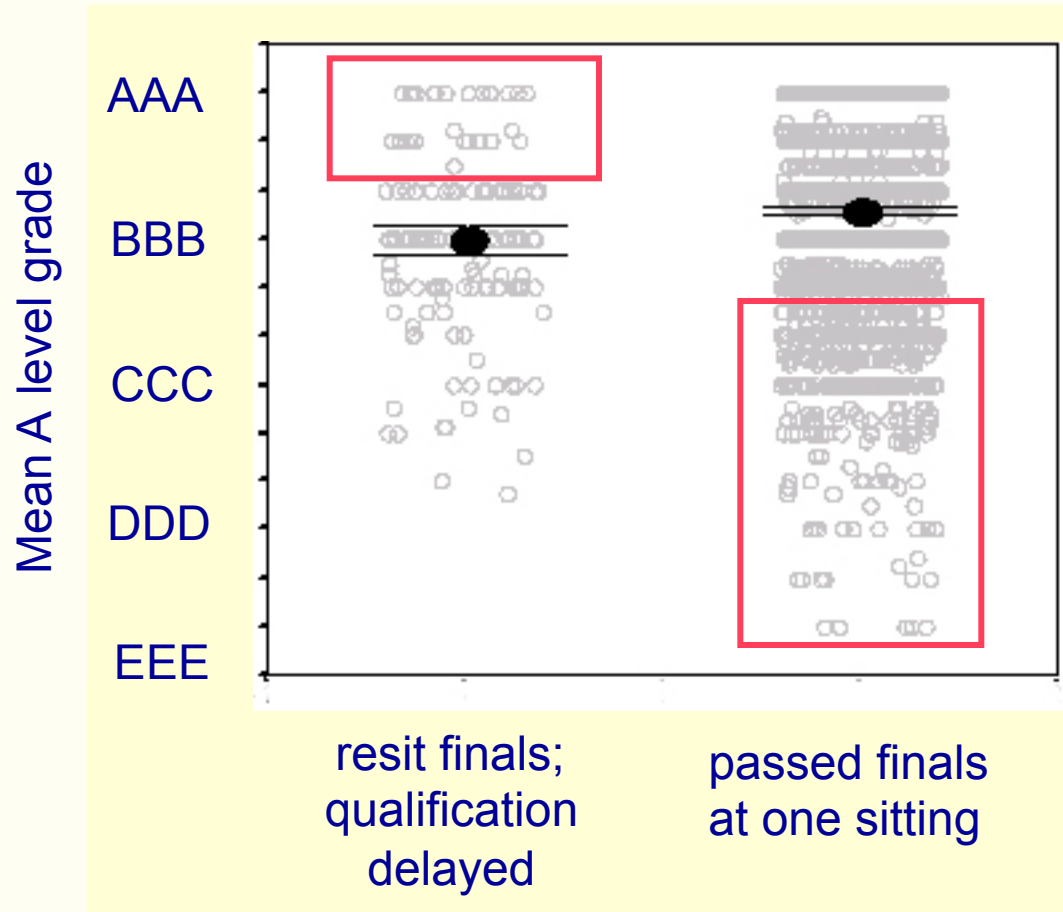
Achievement in relation to A level score



n = 3333

Basic Medical Sciences examinations

Achievement in relation to A level score



Selecting medical students

- ❑ Why are we having this debate.....again?

 - ❑ What are the problems?
 - unsatisfactory doctors?
 - unsatisfactory medical students?

 - ❑ Are we admitting the wrong students?
-

Many doctors are excellent...
and most are adequate

but some are not ...

A few attract notoriety...

- ❑ Harold Shipman, UK:
convicted murderer of 250+ his patients
 - ❑ Howard Martin, UK:
struck off medical register for hastening the deaths
of 18 patients
 - ❑ Jayant Patel, Australia:
gross incompetence, manslaughter of 3 patients,
grievous bodily harm
 - ❑ Graeme Reeves, Australia:
guilty of female genital mutilation
-

Some doctors are deficient in communication skills

- ❑ **Don't communicate adequately or appropriately**
with peers, mentors, patients, patients' families

Some doctors are deficient in communication skills

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NSW Health Care Complaints commission

Number of complaints about doctors has been increasing annually

1616 complaints in 2012-13, concerning

3155 issues ... of which

695 focused on communication

407 related to attitude & manner

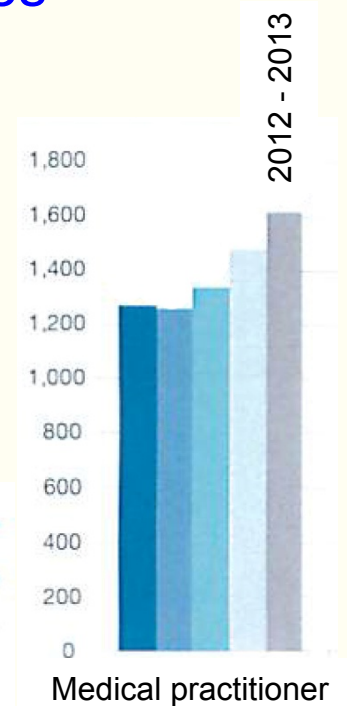
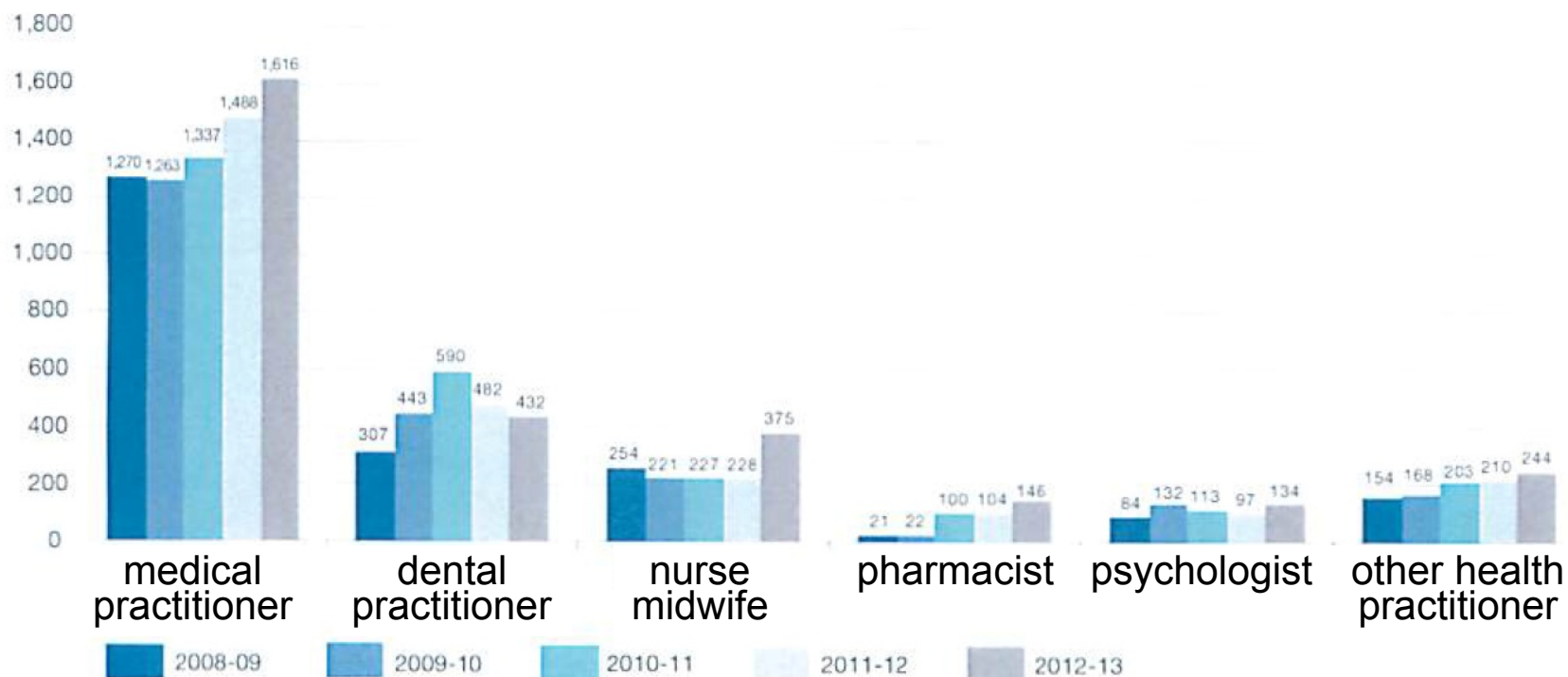


Chart 6.2 – Complaints received about health practitioners 2008-2009 to 2012-2013



Some doctors are unprofessional

Unethical and unprofessional behaviour

- ❑ A significant percentage attract complaints and litigation
(53 per '000 insured doctors; Australia 2000 – 2004)

 - ❑ 2010 UK General Medical Council (GMC)
 - highest ever number of complaints against doctors (7,153)
 - held record number of Fitness-to-Practise hearings (326)
-

Some doctors are seriously compromised

Depression, anxiety

- ❑ 36.7% of sample of primary care physicians (Spain) displayed high levels of ‘psychological discomfort’ associated with practice
- ❑ 1 in 5 hospital doctors (a single centre UK survey) had symptoms of *‘such severe depression and anxiety that they warranted psychiatric care, had it been sought’*
- ❑ “Depression and anxiety are common among doctors and their suicide rate is higher than in the general population”

(Systematic literature review, Elliot *et al.*, 2010)

Some doctors are seriously compromised

High suicide rate

relative to general population

- ❑ Male doctors - 1.41:1
- ❑ Female doctors - 2.27:1

(meta-analysis of studies of physician suicide rates from 1960;
Schernhammer & Colditz, *Am J Psychiatry* 161, 2004)

Some doctors are seriously compromised

Substance abuse

- ❑ 1 in 15 doctors in the UK dependent on alcohol or drugs in their professional lifetime (GMC, 2005)
 - ❑ 1400 doctors across USA disciplined for substance abuse between 1999 – 2004
-

Hypotheses

High incidence of burnout / distress

attributed *inter alia* to:

- ❑ stressful work environment
- ❑ long working hours
- ❑ conflict between work and personal life tasks
- ❑ individual psychological vulnerability

Poland: 10 year longitudinal study (n=365)

- ❑ significant psychological qualities [predict] job and life performance of medical graduates
- ❑ coping styles are the indicators of satisfaction with medicine as a career

A study of 2999 Australian Doctors.....

- ❑ factors associated with psychiatric morbidity
...having personality traits of
neuroticism and introversion
- ❑ and with potentially hazardous alcohol use
...having personality traits of
neuroticism and extraversion

The relationship between resilience
and personality traits in doctors:
implications for enhancing well being.

Eley *et al.*,

PeerJ 1:e216, 2013; DOI [10.7717/peerj.2](https://doi.org/10.7717/peerj.2)

Selecting medical students

Why are we having this debate.....again?

What are the problems?

- unsatisfactory doctors?
 - unsatisfactory medical students?
-

As Medical Educators....

We all have had experience of
students who cause concern

- they are a small proportion of any cohort
 - and may be progressing academically through medical school, but....
-

A survey of professionals

Clinical staff (n = 190 respondents; Australia)

asked to list undesirable personal

characteristics they *had observed* in medical

students

Inappropriate behaviours and attitudes observed in medical student

- 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

Academic failure?

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

- attendance at academic progress committee
- termination of enrolment for academic reasons
- voluntary withdrawal for academic or personal reasons
- course suspended for academic or personal reasons

Problems observed in medical students

USA: 53% of 2682 medical students in 7 schools (Dyrbye *et al.*, 2010)
met criteria for professional burnout (emotional exhaustion,
depersonalisation, low sense of personal achievement)

USA: >2000 medical students in 6 schools (Goebert *et al.*, 2009)
12% major depression, 9% mild/moderate, 6% suicidal ideation

USA: 505 medical students in a single school (Schwenk *et al.*, 2010)
14% with moderate to severe depression;
 $\frac{3}{4}$ year > $\frac{1}{2}$ year; Female>Male

Norway: One third of 421 students reported mental health problems
during their first 3 years at medical school (Midtgaard *et al.*, 2008)

Mental illness rife among med students

■ Amanda Davey

Australian medical students are crying out for help with **one in five** admitting to suicidal thoughts in the last year, a problem exacerbated by inadequate psychological support on campus, say student representatives.

The Australian Medical Students' Association is so concerned with the deteriorating mental health of its members that it is now calling on the Federal Government to intervene.

"We are not after special treatment per se but we are asking the government to consider the life of a medical student when making judgements about the average tertiary students' needs," AMSA president, Jessica Dean said.

"If that means additional income support then we would welcome that. The government needs to take into account that we are not normal, our needs are often higher."

Ms Dean said medical students'

unrelenting workload meant it was difficult for them to support themselves financially.

"Most tertiary students can supplement their government support with part-time employment but medical students have high and unpredictable contact hours as well as interstate placements so finding and maintaining part-time employment is nearly impossible," she said.

While tangible causes for the high rates of mental illness are at this stage only speculative, Ms Dean said anecdotally the causes of student psychological distress were not just around financial strain but also due to an uncertain job market and the "intern crisis".

"Not all medical graduates are guaranteed an internship so there is more pressure to perform and compete [for the limited places] which exacerbates the stress."

Concerned about a lack of mental health support services on campus, the Ms Dean said the AMSA will initially focus its



Jessica Dean
President Australian
Medical Students' Association

efforts on this area of need.

Private discussions have been held with Health Minister Peter Dutton, she added.

The AMSA's call to action comes on the back of a **report** released last year by Beyond Blue which showed doctors suffer from higher rates of psychological distress and attempted suicide compared to the rest of the professional population.

What do you think?

comment@6minutes.com.au

It's not only medical students....

Australia:

- 48% of 955 students in tertiary education psychologically distressed
- 4.4 x that of age-matched peers
- 11% of the sample had been treated for a mental health problem

Is this the co-incidence of psychological vulnerability and a demanding academic environment?

❑ Med school burnout **linked** to unprofessional behaviour

Mayo Clinic study reported in *JAMA* Sep 2010

❑ Disciplinary action by a medical board **strongly associated** with prior unprofessional behaviour at medical school

Papadakis *et al.*, *NE J Medicine* 353, 2005, 2673-2682

- poor reliability and responsibility
 - poor initiative and motivation
 - severely diminished capacity for self improvement
-

What do we know about Medical School applicants?

- ❑ high academic achievers
 - ❑ motivated to apply
 - ❑ in most countries their numbers greatly exceed the number of places available
 - therefore selection is highly competitive
-

In 2012, in the UK

- ❑ 24,347 applicants (median age 18) for undergraduate entry to medicine and dentistry
 - ❑ 9,078 of whom were accepted (2.7 : 1)
-

In 2012, in the UK

- ❑ Prior academic achievement still the predominant selection criterion

‘the brightest and best’; ‘the cream’

- ❑ Mean tariff score of entering medical students = 418
i.e. Better than 3 grade ‘A’ at A-level (= 360)
-

In the USA and Canada

- ❑ overview of medical school admission processes; 120 respondents
- ❑ mean importance (/5) of applicant data in making offers:
 - ❑ interview recommendation 4.5
 - ❑ letters of recommendation 3.7
 - ❑ cumulative undergraduate GPA 3.6
 - ❑ MCAT total (exc. writing sample) 3.4

Selector's advantage

- ❑ choose the best; “the cream of the cream”
 - ❑ very high academic thresholds
 - ❑ academically eligible pool differentiated by:
 - Tests of advanced scientific knowledge
(MCAT, GAMSAT, BMAT etc.)
 - Cognitive skills tests
(MCAT, UKCAT, GAMSAT, UMAT, HPAT-Ireland etc.)
 - Personal statements
 - Referees' reports
 - Interviews
-

Is this the right way?

Many have asked the question...

- ❑ *Medical Education*, 37, 2003
 - ❑ *Medical Journal of Australia*, 88, 2008;19 March 2012
 - ❑ *BMJ*, 16 February 2010
 - ❑ *Lancet*, 28 August 2010
 - ❑ *Medical Teacher*, 33, 2011
 - ❑ *Academic Medicine*, 88, 2013
-

What are the indicators we have not got selection right?

Donald A Barr, *The Lancet* 376, 2010, 678-9

❑ “found no scientific evidence that supported the power of performance in undergraduate science courses as a way to predict clinical or professional quality as a physician”

AND

❑ “found...consistent evidence that performance in the premedical sciences is inversely associated with many of the personal, non-cognitive qualities so central to the art of medicine”

High achievers

Lower achievers

Science GPA

painstaking
patient
silent
mild

progressive
poised
self-controlled
wide interests

Preference for Science Subjects

conservative
forceful
hasty
irritable

progressive
easy going
relaxed
warm

Composite Index of Scientific Aptitude

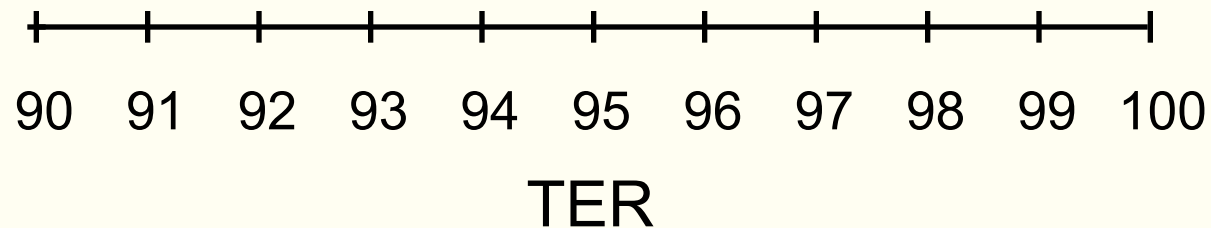
awkward
conservative
painstaking
cautious

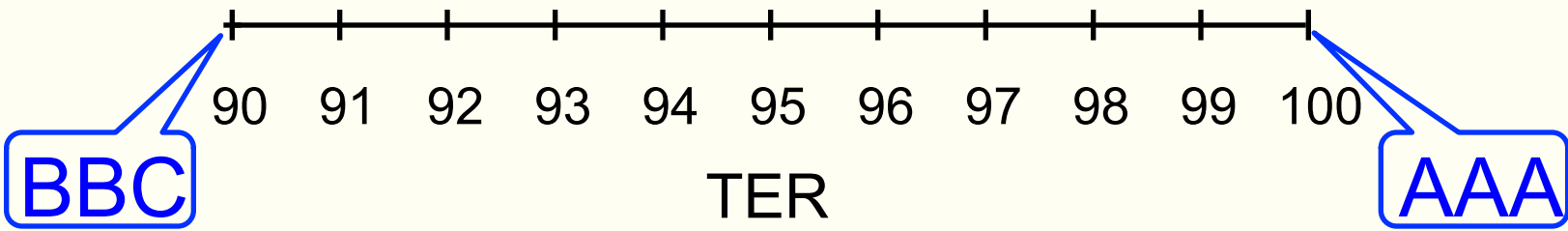
progressive
relaxed
stable
adaptable

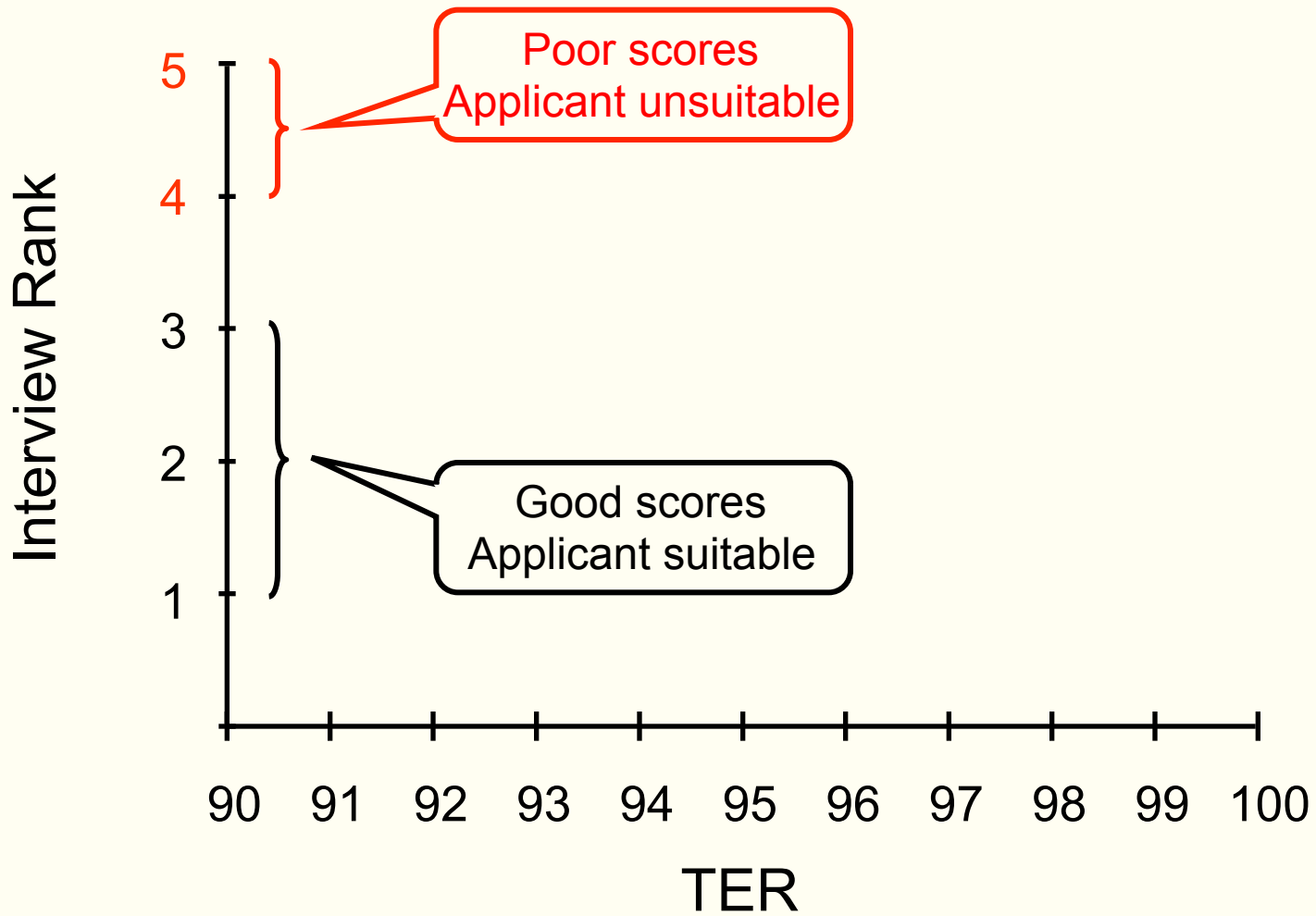
shy

tactful

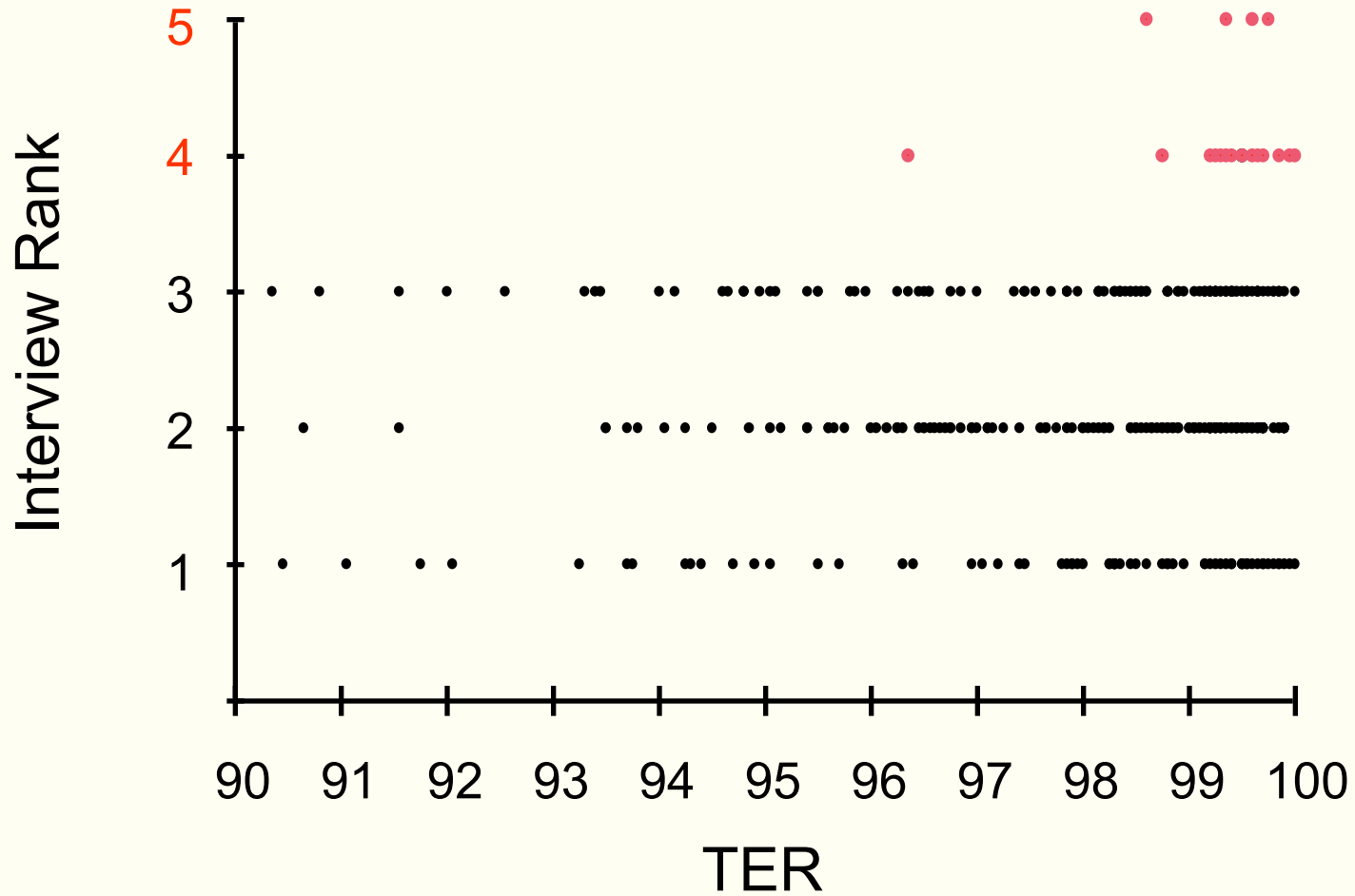
TER = tertiary entrance rank







n = 332



Paradigm shift

Most medical students (and doctors) are satisfactory.

Just a small minority are troublesome

SO

Realign selection effort from
differentiating the top academic achievers

TO

identifying the potentially unsuitable

Can we identify the potentially unsuitable at the outset?

- ❑ academic record
 - ❑ cognitive skills – UMAT, UKCAT, MCAT etc
 - ❑ personal statement
 - ❑ referees' reports
 - ❑ interview – panel, MMI
 - ❑ non-cognitive tests (personality measures)
-

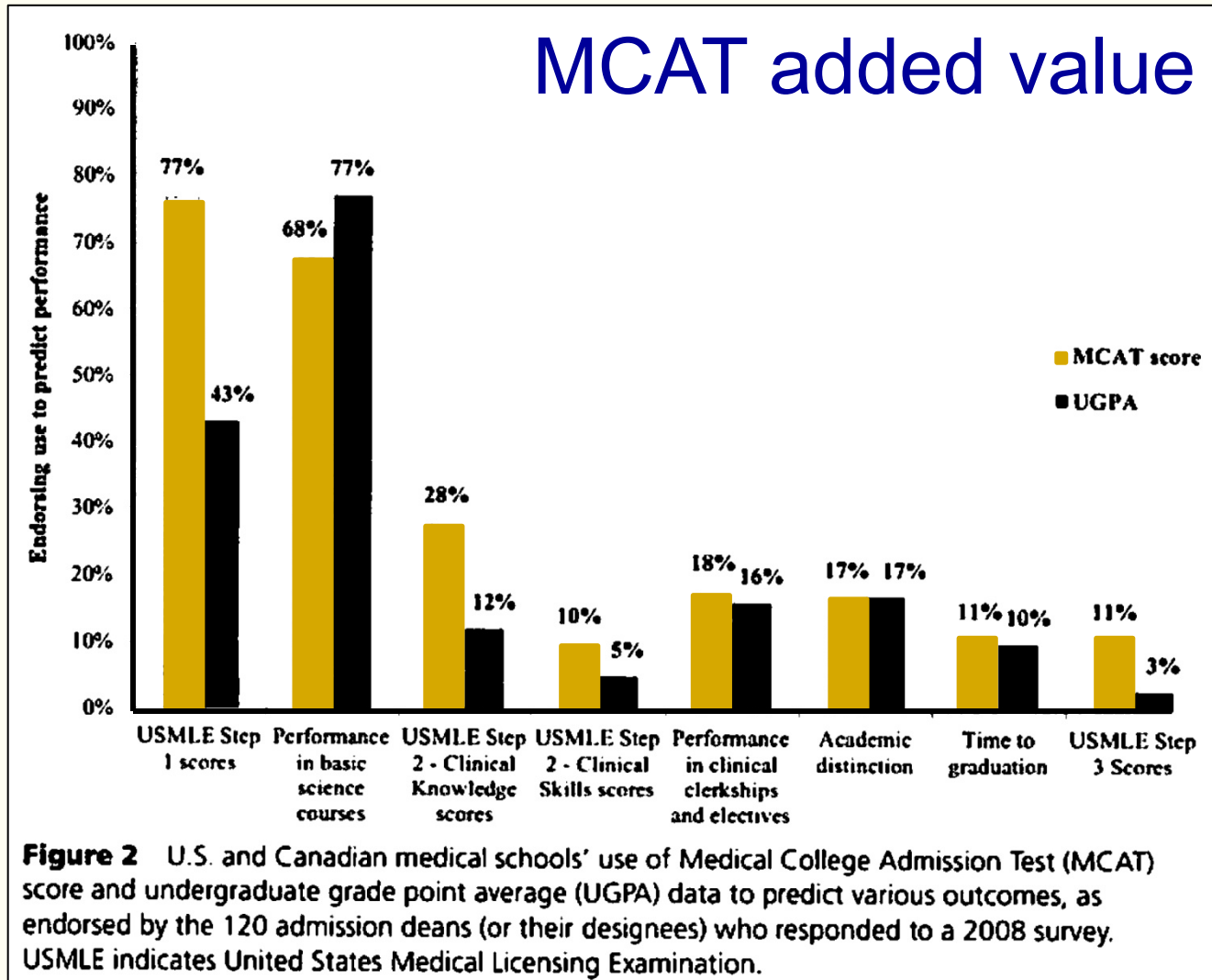
Cognitive skills

- ❑ “Intelligence is the best predictor of job performance”

Ree & Earles, *Current Directions in Psychological Science* 1,1992,86-89

- ❑ Most add little to GPA in predicting outcomes
 - AH5 intelligence test
 - GAMSAT
 - UMAT
 - HPAT-Ireland
-

MCAT added value



Personal statements

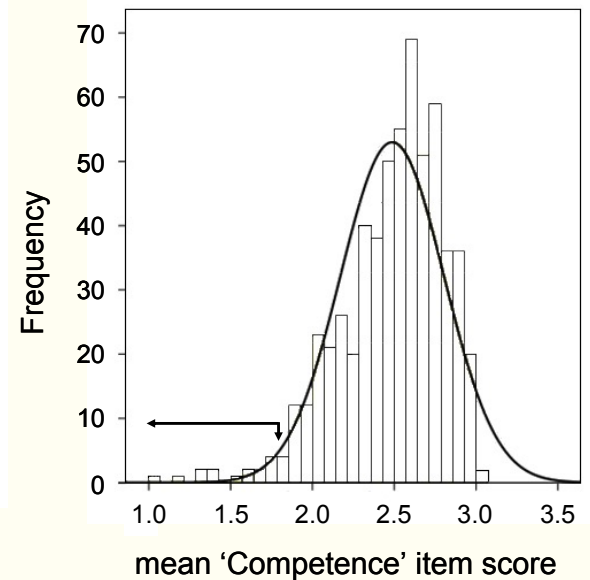
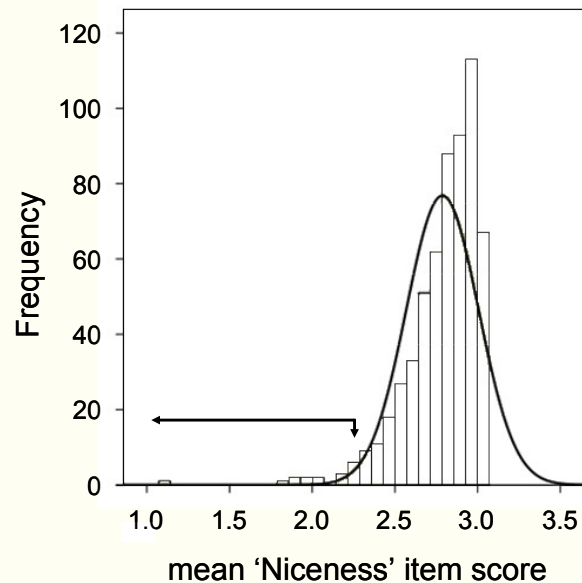
- ❑ fakeability!
- ❑ plagiarised
- ❑ labour intensive to assess
- ❑ criticised for “the potential for impression management, and their limited ability to predict future performance”

Editorial: Wilson *et al.*, *MJA* 196, 2012

Referees' reports

- ❑ have low validity even when structured to increase reliability
- ❑ strongly skewed
- ❑ can identify the poorly regarded candidates

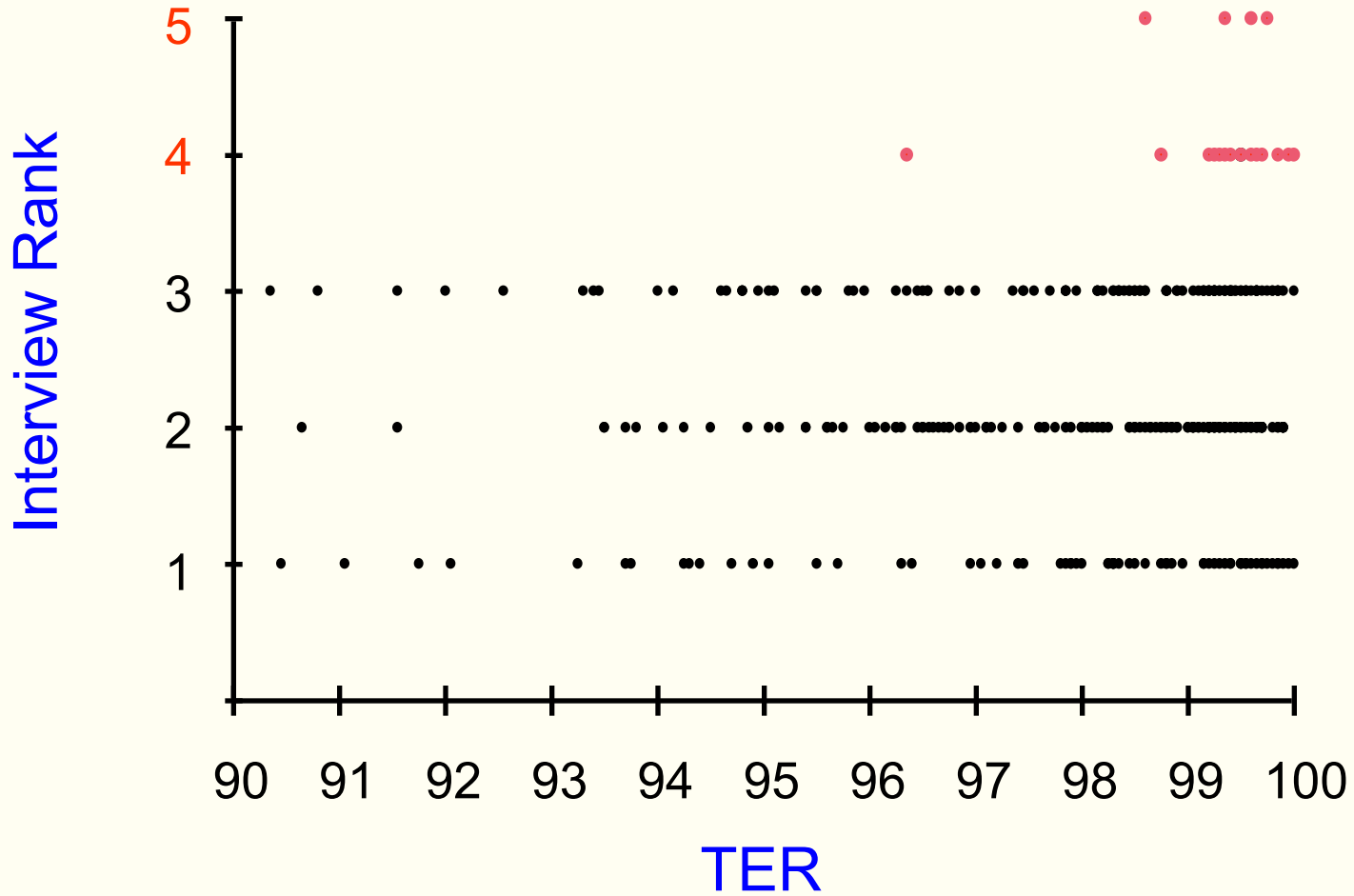
N=585



Interviews

- ❑ frequently a 'story telling' session
 - ❑ coaching clinics
 - ❑ Panel Interviews
 - low reliability (interviewer biases)
 - communication skills
 - allows observation of behaviour and attitude
-

n = 332



Interviews

□ Multiple Mini Interview

- better reliability (e.g., .75 vs .42)
- may be a good instrument to assess skills

Newcastle, Australia

- ❑ 8 independent stations
 - each measure a distinct skill or behaviour
 - scored objectively
 - meets criterion / borderline / does not meet criterion**

- ❑ All stations
 - assess 'communication skills'
 - scored objectively
 - meets criterion / borderline / does not meet criterion**

AND

Subjective concerns

- All stations
 - record 'concerns'
 - scored subjectively

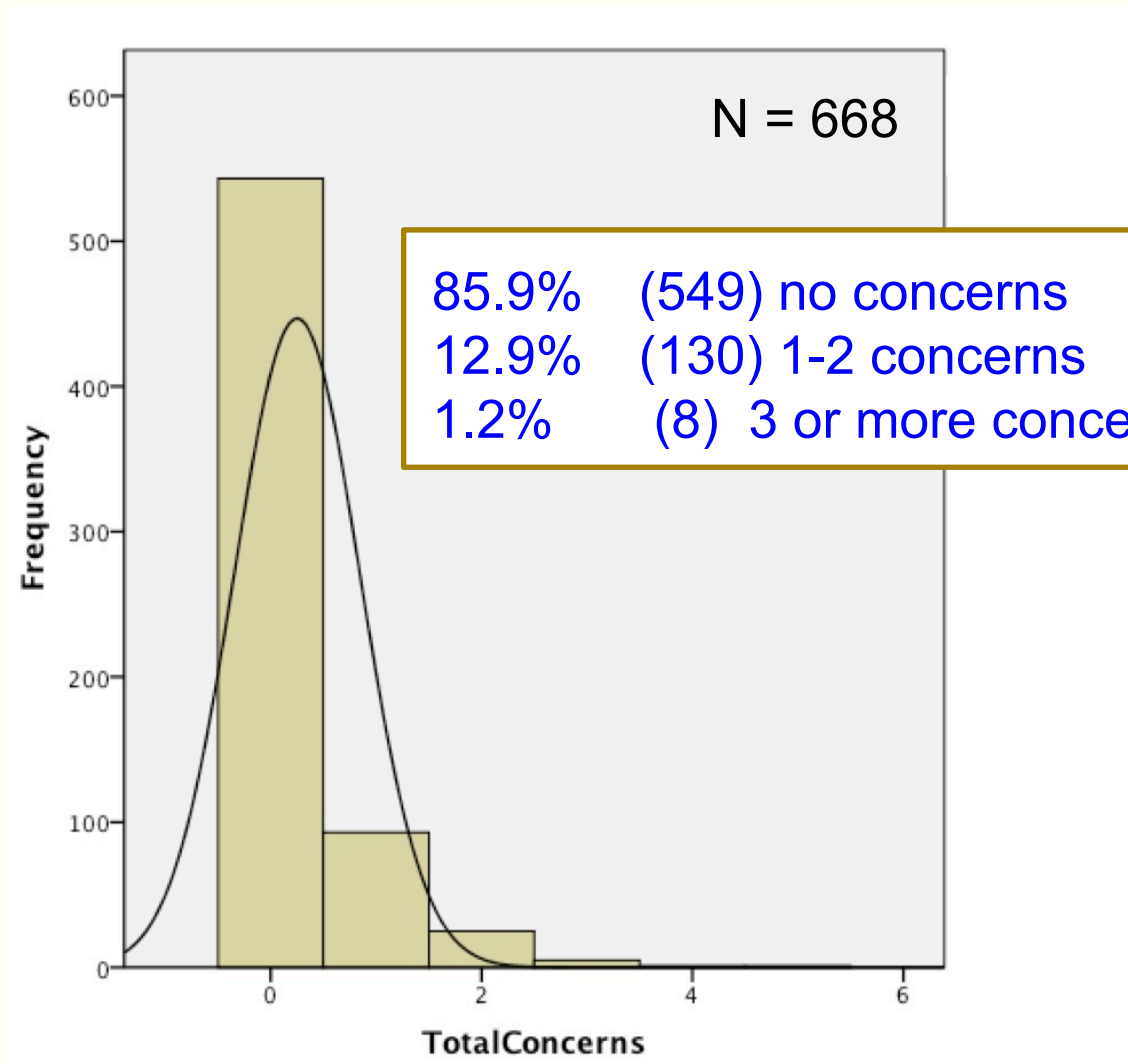
**I have concerns about the attitude or behaviour
of this applicant**

vs

I have no concerns

- Three strikes and you're out!
-

Frequency graph for concerns



Non – cognitive tests

- Relevant personal qualities
 - conscientious (vs unreliable)
 - resilient (vs unable to cope with stress)
 - self-controlled (vs disorderly or unrestrained)
 - ethical (vs dishonest, immoral)
 - empathic (vs detached, withdrawn)
 - etc. etc.
-

PQA

A battery of (non-cognitive and cognitive) tests:

- Moral Orientation: ethical decision making,
social responsibility
- Personality
Involved (empathic and confident) vs. Detached (narcissistic and aloof)
Resilient vs. Emotional ('neuroticism')
Self-Controlled vs. Disorderly
- Mental Agility Test (diverse high level reasoning skills)

Construct validity

PQA personality scores have been correlated with other standard measures, e.g.,

- 16PF modified (Cattell, 1998)
- IPIP Five-Factor Test - 'Big 5' (Goldberg, 1999)
- Right Wing Authoritarianism (Altemeyer, 1982)
- Emotional Intelligence (Schutté *et al.* 1998)
- Eysenck Personality Questionnaire (Eysenck, 1985)
- Depression, Anxiety & Stress Scales (Lovibond, 1995) [modified]
- Horney-Coolidge Type Indicator (Coolidge, 2001)

'Big 5' correlates of PQA dimensions

	PQA Traits		
'Big 5' (NEO-PI)	Involved	Resilience	Control
Agreeable	.58***	.24***	.35***
Neurotic	-.28***	-.86***	-.30***
Conscientious	.26***	.35***	.82***
Extraverted	.49***	.42***	.11*
Open	.44***	.07	-.20***

n = 427 psychology students

Reliability (Cronbach alpha coefficients)

Moral Orientation

(social responsibility): .88

Involved: .87

Resilience .89

Self-Control .85

'socially desirable answers' .73

(Running averages over a large number of studies)

The million dollar question.....

do non-cognitive tests predict a better outcome?

The main stumbling block....

- Absence of relevant & robust outcome measures
 - behavioural
 - on the job performance
 - i.e. more than just academic outcomes
-

The million dollar question.....

- ❑ do non-cognitive tests predict a better outcome?
 - ❑ Is it acceptable to use such tests on face validity grounds? For example to...
 - *exclude* those who display extreme qualities deemed unsuitable for medical practice?
 - *exclude* those who display very low resilience?
-

Where we came in.....

“The methods of selection fail to exclude a number who, though able to pass examinations, have not the necessary aptitude, character, or staying power for a medical career”

British Medical Association, in their evidence to the Goodenough Committee, 1944;
reported in DH Smyth, *BMJ* 14 September 1946

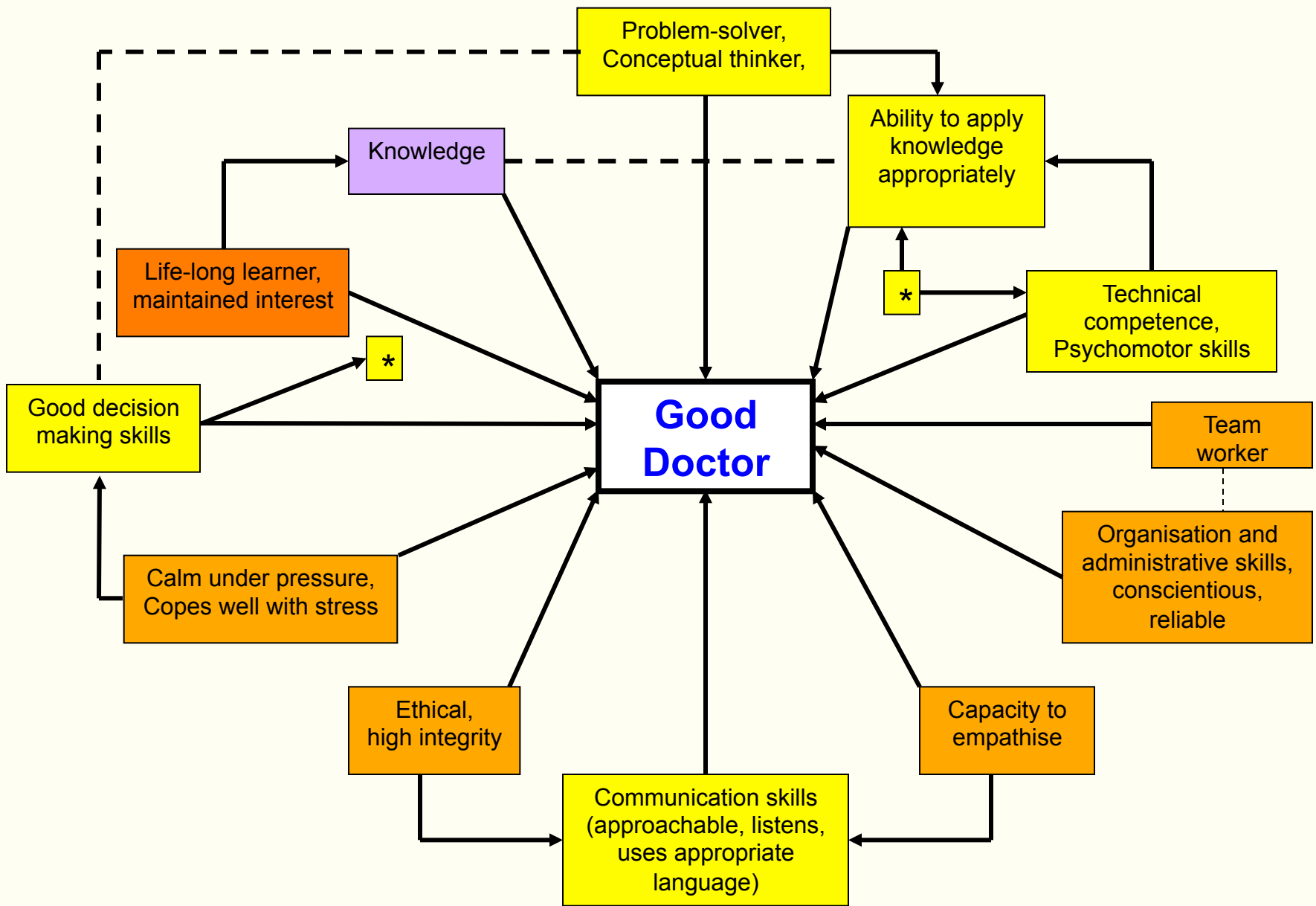
A model for Medical Student Selection

❑ Besides selecting **in** for

- academic ability and cognitive skills
- ability to communicate appropriately
- good interpersonal skills

❑ Select **out** those who demonstrate traits of

- psychological vulnerability
(inability to handle stress appropriately; low resilience)
 - high levels of neuroticism
 - low levels of conscientiousness
 - extreme detachment, extreme emotional involvement
 - high levels of impulsiveness and permissiveness
-



PPIK theory:

