

Intelligence and academic attainment as predictors of medical careers: A twenty-year follow-up

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Attainment and ability

- **Ability (aptitude)**

- General mental ability (GMA)
 - Intellectual ability
 - Intelligence / IQ
- Generic intellectual and problem-solving skills,
- Independent of specific problem content
- Stable across the life-span
- Few effects of training or practice

- **Attainment (achievement)**

- School-leaving examinations (e.g. A-levels in the UK)
- Mastery of specific content (e.g. biology or chemistry)
- Dependent on motivation, study habits and personality
- Dependent on teaching and educational opportunity

Medical school selection

- Selection in the UK depends to a great extent on *attainment at A-level*
- What is the rationale for using attainment tests?
 - Direct assessment of necessary background knowledge
 - Biology, chemistry, physics and mathematics are the academic underpinning of medical science
 - A-levels are indirect indicators of motivation and study habits
 - Prediction not only of success in undergraduate medicine but also of life-long professional learning
 - Surrogate measures of ability (intelligence)
 - Doctors need to be intelligent and people with high A-level grades are more intelligent
 - If this is the rationale it may be better to use proper IQ tests which are less dependent on educational opportunity

Hodge puts case for poorer students

Will Woodward
Education editor

Universities were urged yesterday by the higher education minister, Margaret Hodge, to give places to bright students from poorer state schools — even if they had worse A-level grades than those from the independent sector.

Mrs Hodge gave her backing to a Bristol University scheme which looks favourably on good applicants from schools whose average A-level candidates achieve fewer than three Cs, and in many cases gives them lower offers.

She said A-levels — long regarded as the “gold standard” of English education — were poor predictors of potential.

In a speech setting out the government’s higher education agenda over the next 10 years, Mrs Hodge promised more money for universities but gave the clearest signal yet that the review of student finance would not see a return to a system of widespread maintenance grants.

“It is clear that there are competing priorities within HE, across education and indeed across government,” she told the Social Market Foundation in London. “It would be a gross abdication of my duty to focus our money on subsidising tuition and living costs for students at the expense of other priorities.”

The comments suggest that the chancellor has won a battle within Whitehall over the scale of reform of the student finance system introduced by Labour in 1997. While hopes that tuition fees would be scrapped always appeared pipe dreams, the speech does suggest hopes that an old style maintenance grant could be restored have gone too.

But Mrs Hodge did offer the prospect of some money for the poorest students when the review was announced — expected, she said, when government spending plans came out in July.

“We want to make sure that light or the fear of debt does

not deter young people, especially those from non-traditional backgrounds, from going to university, but we cannot ignore the under-investment in our university infrastructure, the investment we need in teaching, in research and to expand places in the sector.”

Mrs Hodge warned academics that the government would not prop up unpopular universities as it allowed popular ones to expand — even if it meant some going to the wall. “No institution has a god-given right to continue in its present form... I do expect to see a different pattern of provision in 10 years’ time. Some universities may well have gone, others will have expanded.”

Universities had to concentrate on what they did best, Mrs Hodge said, but all had to improve working class access. “I’m tired of hearing academics claim state schools are not turning out young people with much ability and potential.”

“Of course the A-level is important but what’s being shown is increasing evidence that they aren’t necessarily the only way of measuring potential,” Mrs Hodge told reporters.

“What I want the universities to do — particularly the universities that are currently taking on fewer than one in five young people from half the countries’ population — is to take the brightest and the best,” Mrs Hodge said.

Birmingham, Warwick, Newcastle, Nottingham and Cambridge all take account of low performing schools to some degree already.

Tim Cole, an admissions tutor in Bristol’s history department which was singled out by Mrs Hodge, said that in 1998 just 40% of its entrants were from state schools. Now it was up to between 60% and 70%.

“We’re trying to put our money where our mouth is and to think about potential — to reward and identify potential and not just slip back into offers on A-level results.”

More at EducationGuardian.co.uk

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The questions

- Do A-levels predict medical careers?
- Does intelligence predict medical careers?
- Which is the better predictor?

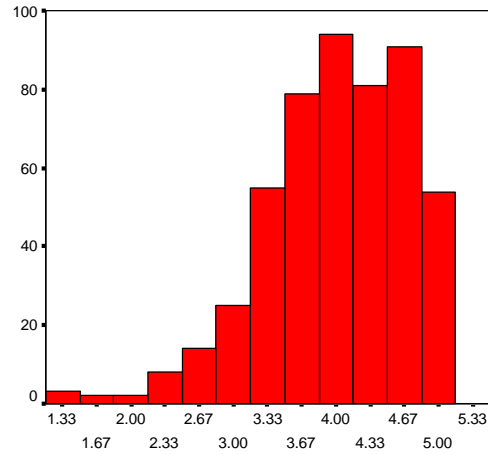
Need a long-term prospective study
which measures:
–A-level grades
–Intelligence

Westminster Medical School Follow-up

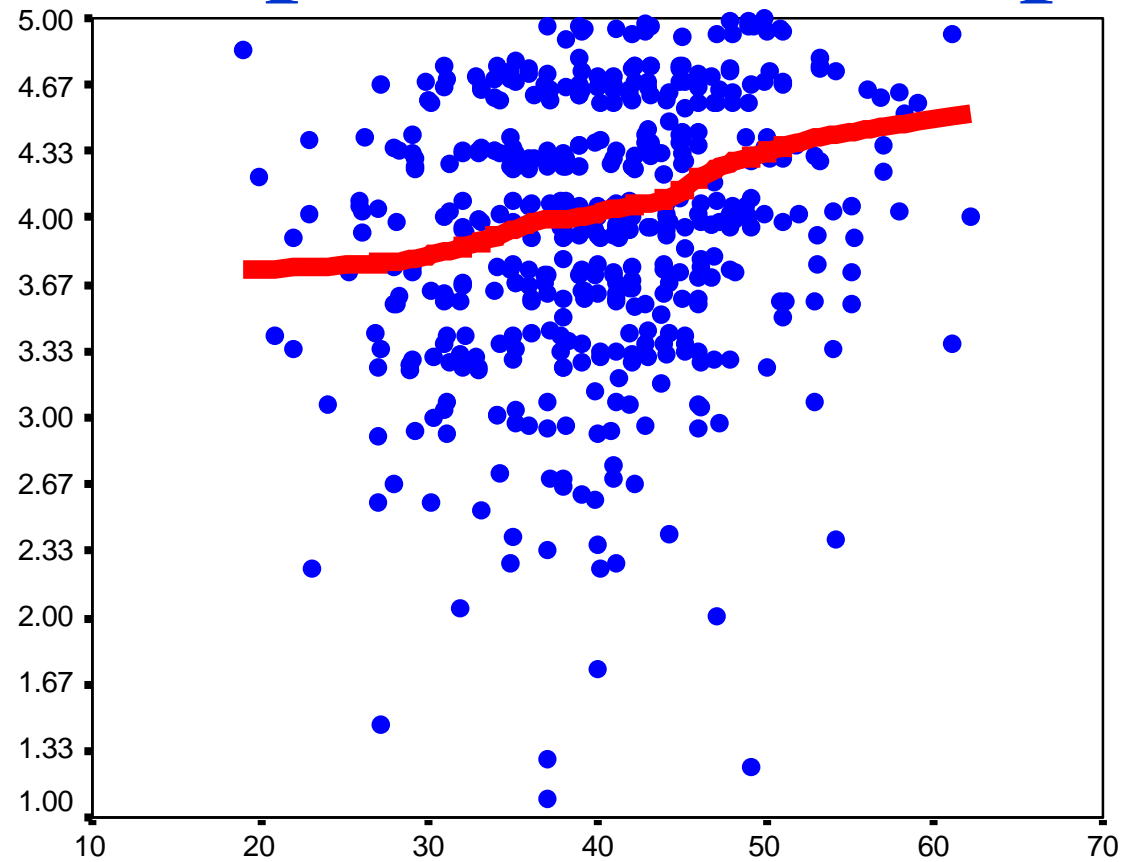
- Dr Peter Fleming
 - Clinical entrants to Westminster, 1975-1982
 - Age, about 21 (born 1954-1961)
 - Timed IQ test (AH5): Verbal & Spatial scores
 - N=511

Westminster Hospital Follow-up

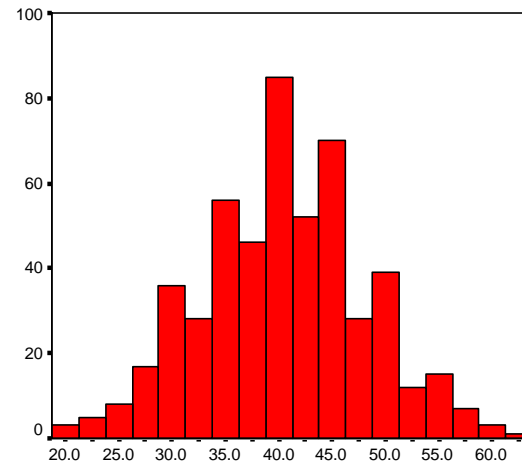
- IQ and A-levels



Mean A-level grade



Total
AH5
score



Westminster Medical School Follow-up

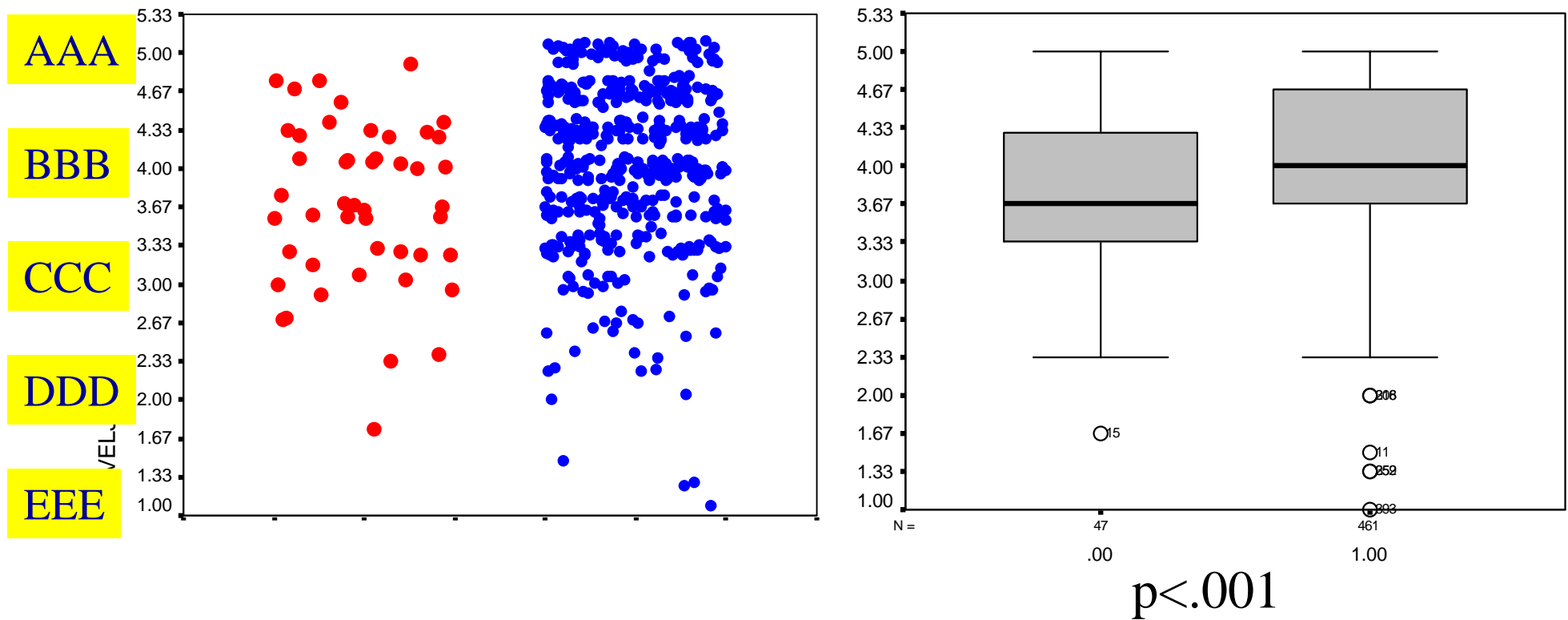
- Dr Peter Fleming
 - Clinical entrants to Westminster, 1975-1982
 - Age, about 21 (born 1954-1961)
 - Timed IQ test (AH5): Verbal & Spatial scores
 - N=512
- Followed up 1989 (McManus & Tunnicliffe)
 - Qualified 1978-1985 (4-11 years previously; aged 28-35))
- Followed up 2002 (McManus, Smithers & Partridge)
 - Qualified for 17-24 years
 - Age, about 41-48

Westminster Medical School Follow-up

- Follow-up in 2002
 - *Medical Register & Medical Directory* CD-ROMs
 - N=511
 - 464 on the register
 - 47 not on the register (9.2%)
 - ?? death / emigration / alternate career / other
- *Who* dropped off the register?

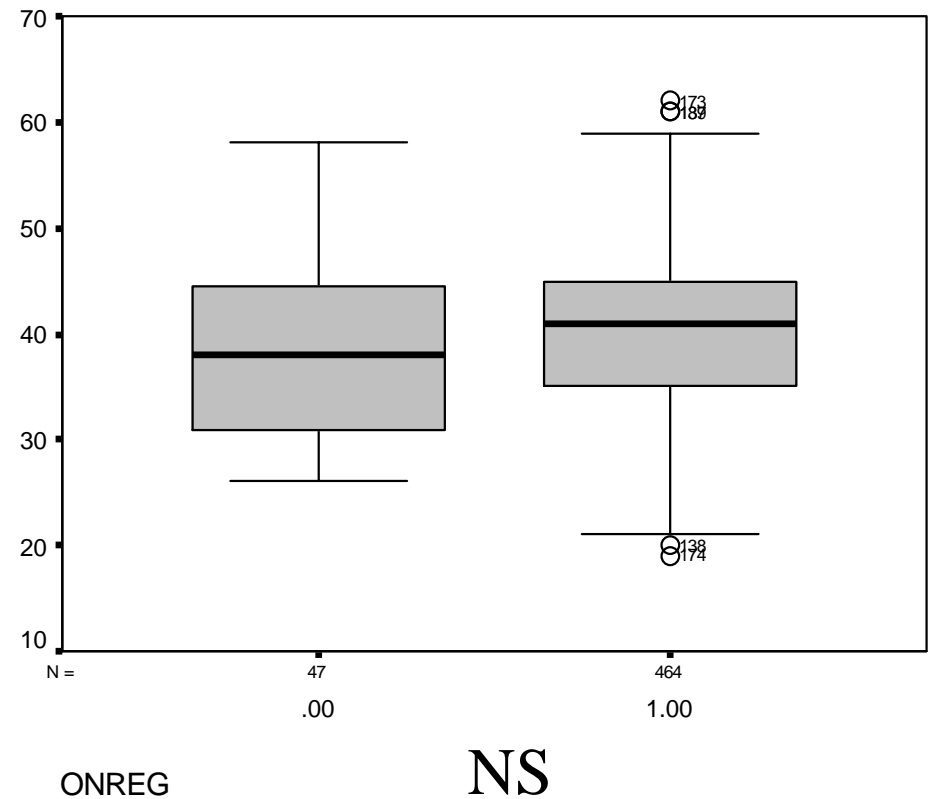
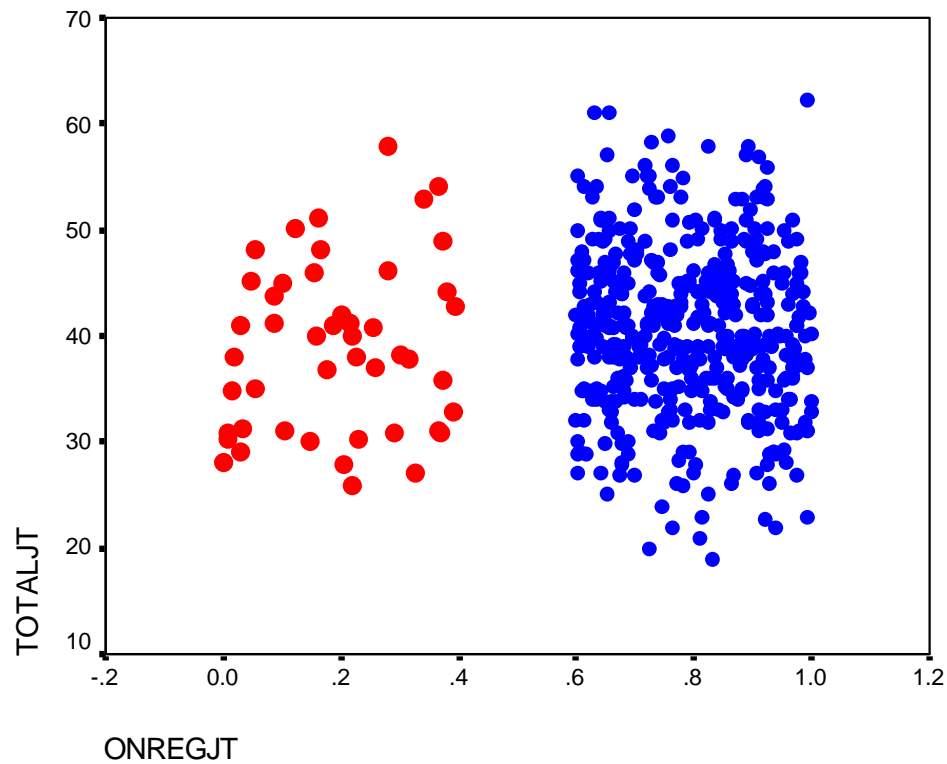
Westminster Medical School Follow-up

Dropouts by A-levels



Westminster Medical School Follow-up

Dropouts by Total IQ

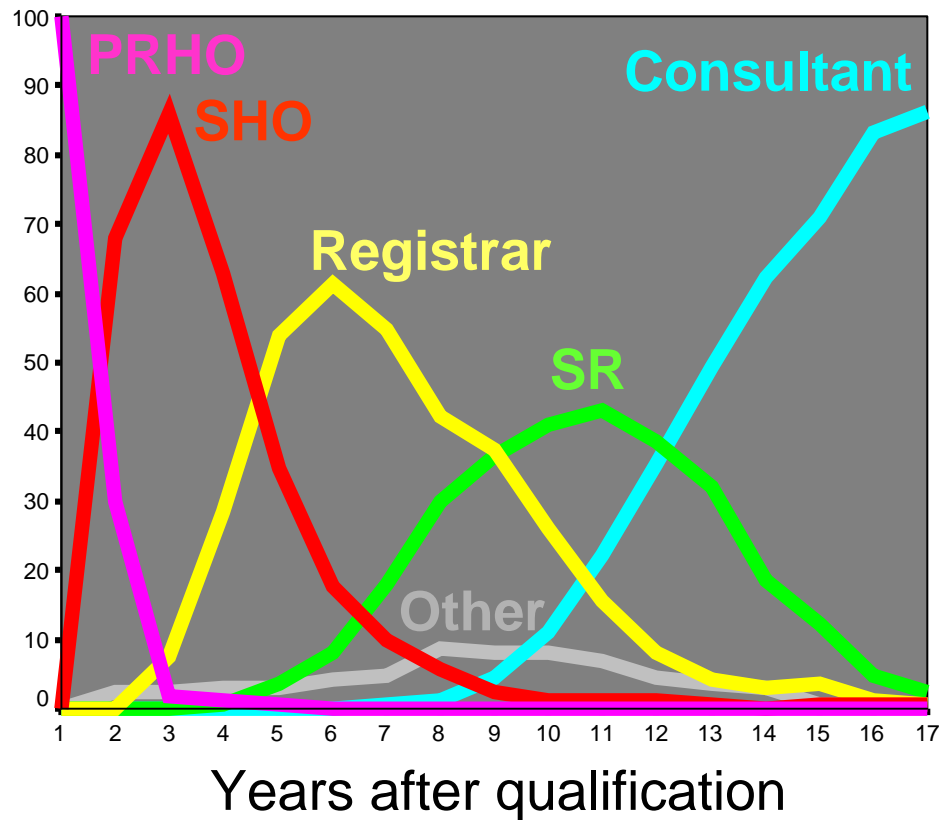


Westminster Medical School Follow-up

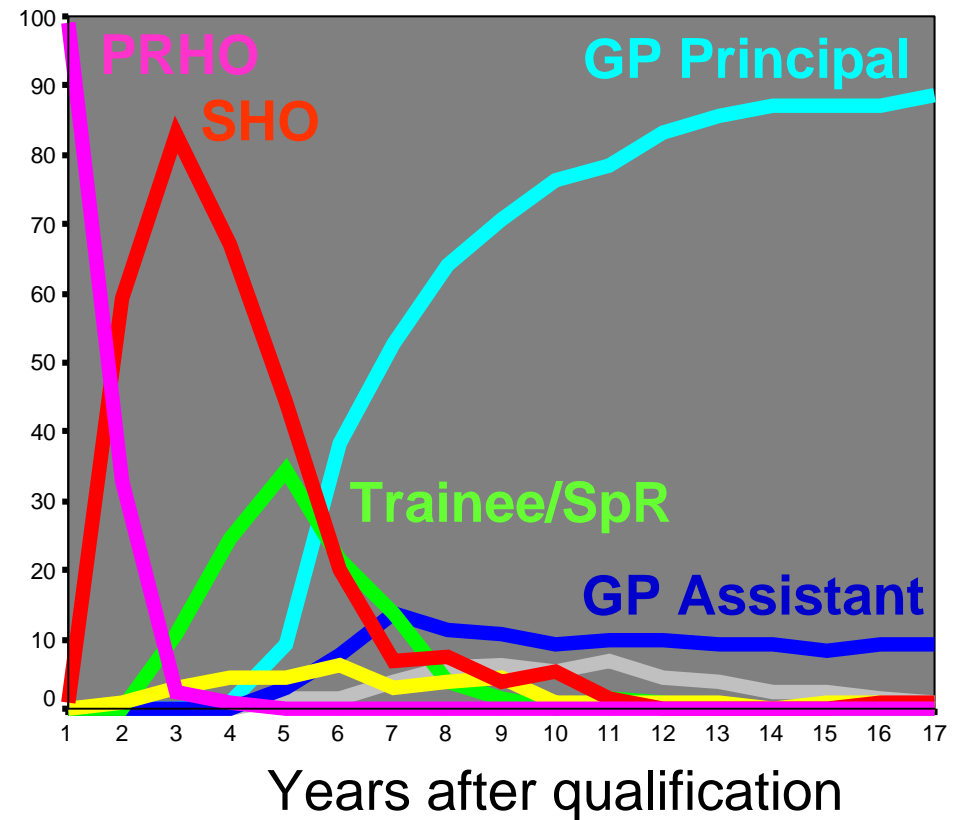
- Questionnaire to all those on the Register
 - N=464
 - Sent January 2002
 - Two reminders: final return date 26th April 2002
 - Response rate (26th April)
 - 349 responses (75.2%)
 - 5 subsequent questionnaires which have not been analysed
- Questionnaire:
 - Career choice, post-graduate qualifications and career progression
 - Stress and burnout; workload
 - Communication style and empathy
 - Personality (Big 5)
 - Masculinity-femininity

Career progression

Hospital Doctors

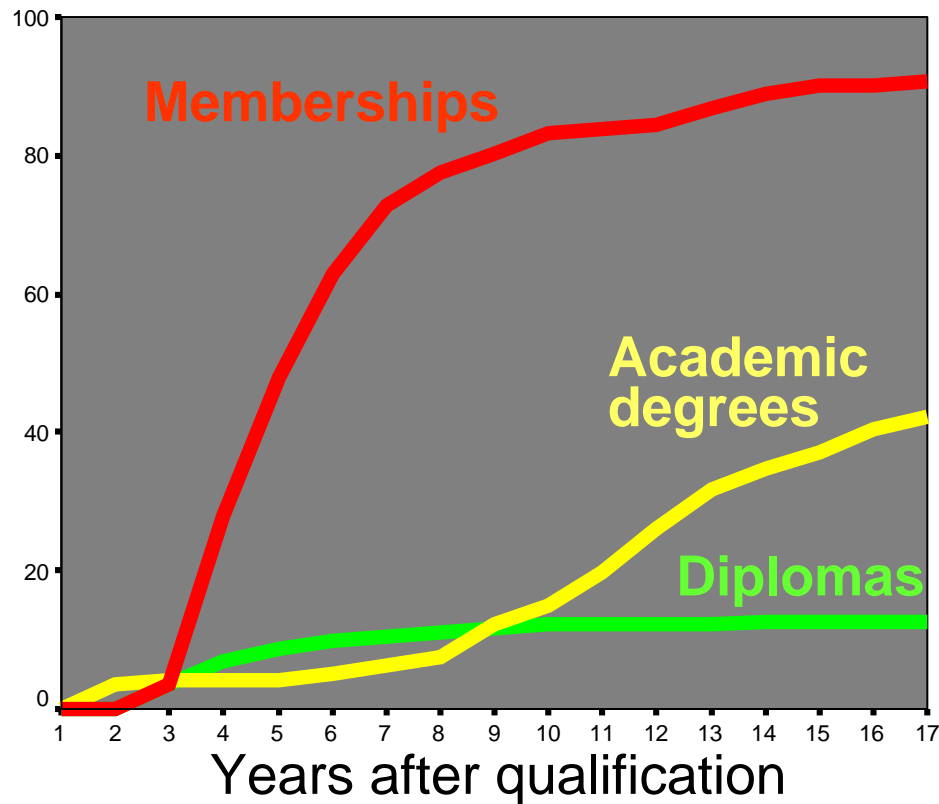


General Practitioners

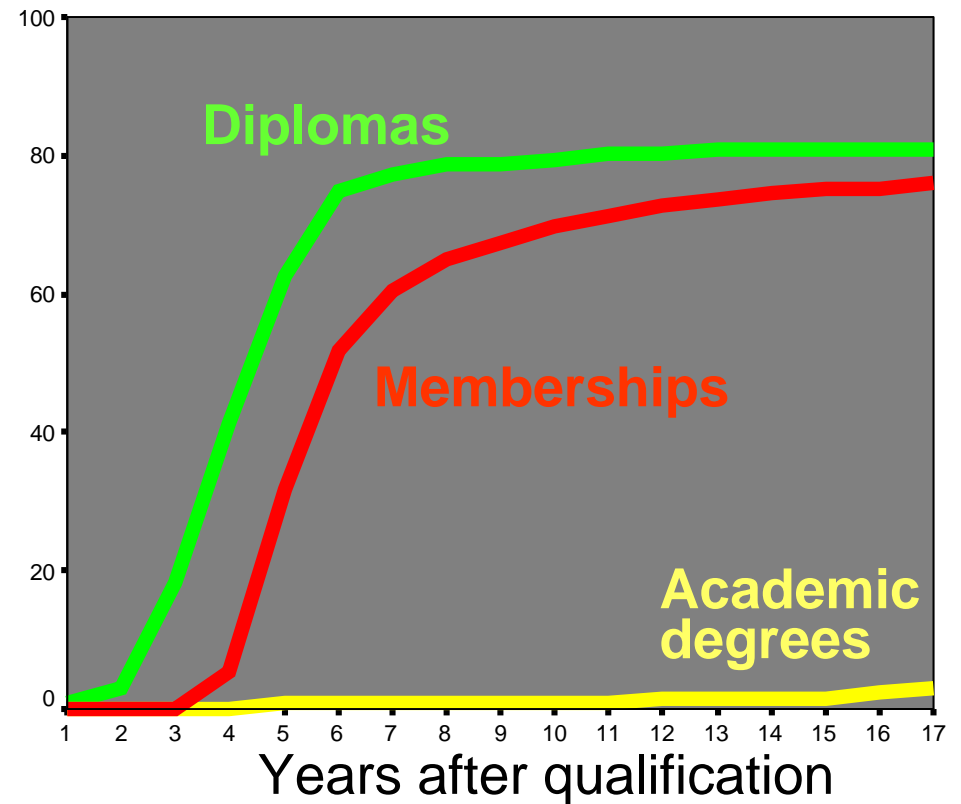


Post-graduate qualifications

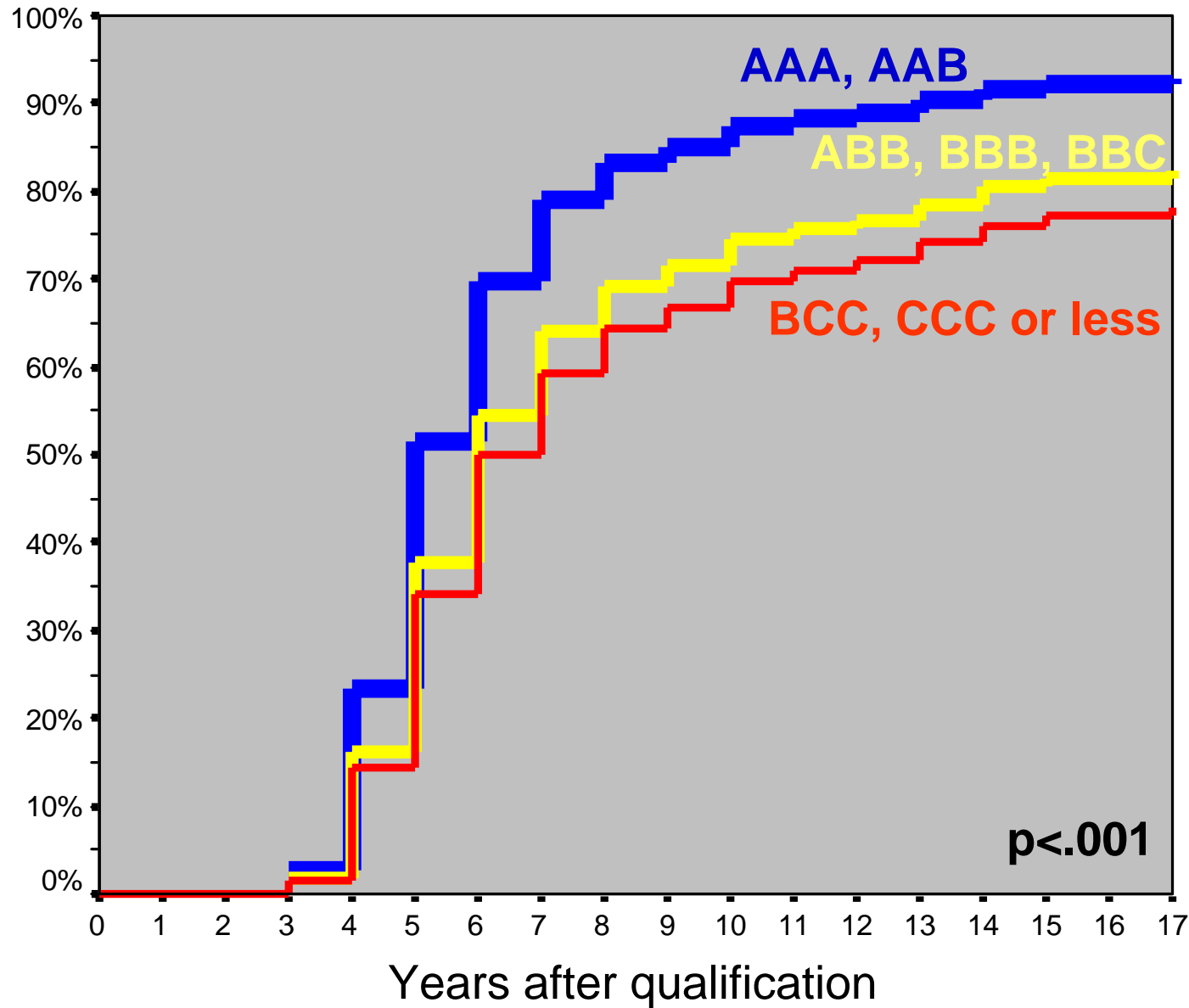
Hospital Doctors



General Practitioners

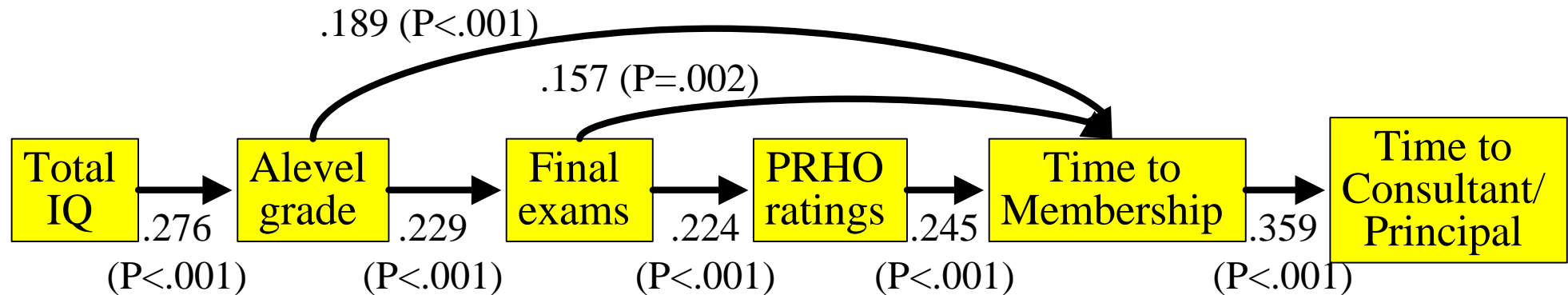


A-levels, IQ and Memberships



Intelligence: $p = .012$ (after taking A-levels into account, $p = .423$)

Modelling academic careers



- Intelligence
- A-level grades
- Performance in finals
- PRHO ratings
- Time to membership
- Time to Consultant/Principal

Conclusions

- A-level grades (**attainment/achievement**) predict medical careers
 - Undergraduate and PRHO performance
 - Time to Membership
 - Time to Consultant/Principal
 - Dropout from Medical Register
- Intelligence (**ability/aptitude**) has little predictive value after taking A-levels into account
- A-level predictions are long-lasting.
 - Probably due to being indirect measures of study habits, motivation and self-directed learning rather than because of specific scientific content.