Learning in practice

- Research output—Many doctors publish research

to membership (P=0.049) but not after we accounted for A levels (P=0.401). Other effects of A levels and AH5 were not significant after we accounted for multiple testing.

Modelling Academic and Professional Achievement—We modelled academic and professional achievement using structural equation modelling with causal order mainly determined by temporal order, except that we regarded AH5 score before A levels. Goodness of fit was excellent (χ^2=4.90, df=8, P=0.768; GFI (goodness of fit index)=0.995; AGFI (adjusted goodness of fit index)=0.988). Each stage predicted the subsequent stage, and A level grade and finals performance had additional direct effects on time to membership (fig 3).

Research Publications—In total 138 doctors (40%) had not published any research papers, 44 (13%) had published 1-2 papers, 36 (11%) 3-5 papers, 30 (9%) 6-10 papers, 39 (11%) 11-20 papers, 29 (9%) 21-50 papers, 18 (5%) 51-100 papers, and 8 (2%) had published more than 100 papers. Regression of normal scores (ranked normal deviates; normal order statistics) showed differences between hospital doctors and general practitioners (P < 0.001) but no effect of A levels or AH5 score (table).

Psychological Morbidity—Sixty two doctors (18%) scored ≥4 on the general health questionnaire, indicating "caseness" for

We have shown that A level results, which are measures of achievement, can predict time taken to gain membership qualifications, choosing to become a general practitioner, and leaving the register. In contrast the AH5, which measures ability, cannot independently predict membership qualifications or dropout.

A levels therefore have validity in selection, with a validity coefficient of about 0.3 (see www.bmj.com), although care should be taken in generalising the results to other examinations in other countries. Intelligence does not predict careers, thus rejecting the ability argument. A levels predict because they assess achievement, and the structural model shows how past achievements predict future achievement. Our data cannot distinguish the achievement argument and the motivation argument, although the long term, direct effect of A levels on membership examinations (fig 3) suggests that motivation might be important.

Despite their predictive ability, A levels are probably not the only predictors[2] and should not be the sole basis for selection.[15] Some of our other outcomes were not predicted by A levels but were correlated with measures of personality (see www.bmj.com) and would probably also be predicted by learning styles.[16 17] West answered Smith's editorial question of "Why are doctors so unhappy?"[18] by suggesting that doctors burn out because they are overqualified for a repetitious job.[7] The causes of stress and burnout in doctors are complex,[12] but our data suggest that excess intellectual ability is not one of them.

We thank Robin A M Forrest, secretary of Westminster Medical

Supplemementary definitions

Extra tables

Figures A, B and C

Supplemementary definitions

Achievement, attainment, accomplishment, aptitude, and ability

These five terms are often confused and confusing.

Achievement is relatively straightforward. Dictionaries of psychology describe achievement tests as "any test of acquired ability or skill, a typical example being a test of scholastic attainment,"[w1] and "tests constructed and standardised to measure proficiency in school subjects."[w2] Synonyms are accomplishment,[w2] competency,[w1] and attainment. Achievementhas therefore been used in this paper with all of these related meanings.

Aptitude refers instead to an individual's capacity for learning, with reference to "natural ability"—for example, "suitability, natural ability, or capacity to learn; ... potential rather than existing capacity ... given the necessary education or training,"[w1] and "natural ability to acquire relatively ge5cmal aishmtypical exampref39 asuibefassw1]ility mple being e5cmal aishn exi a3.38 reW nBT/T39 0 0 49 0 0 0 1536 449.4803ETQBT/TT8 ili.428

	A level grade	Total AH5 score	Verbal AH5 score (part I)	Spatial score (

*Results significant at P<0.05.

Table C Association of personality measures with

stress and burnout. Results are shown as the simple Pearson correlation (*r*), and the regression coefficient (β) after taking all other variables into account (with P value in brackets). "Not included" indicates that significance did not reach 0.05 so that variable was not included in final multivariate analysis)

	Stress (GHQ-12)	**Burnout**		
		Emotional exhaustion	**Depersonalisation**	**Persona accomplishı**
Extraversion	*r*= – 0.273 (<0.001) β = – 0.175 (<0.001)	*r*=– 0.156 (0.005) Not included	*r*= – 0.137 (0.014) Not included	*r*=0.297 (<0. β = 0.273 (<0
Neuroticism	*r*= 0.453 (<0.001)* β = 0.401 (<0.001)*	*r*= 0.409 (<0.001)* β =0.411(<0.001)*	*r*=0.205 (<0.001) β = 0.172 (0.001)	*r*= – 0.137 (0 Not includ
Openness	*r*= – 0.008 (0.887) Not included	*r*= 0.028 (0.613) Not included	*r*= – 0.059 (0.291) Not included	

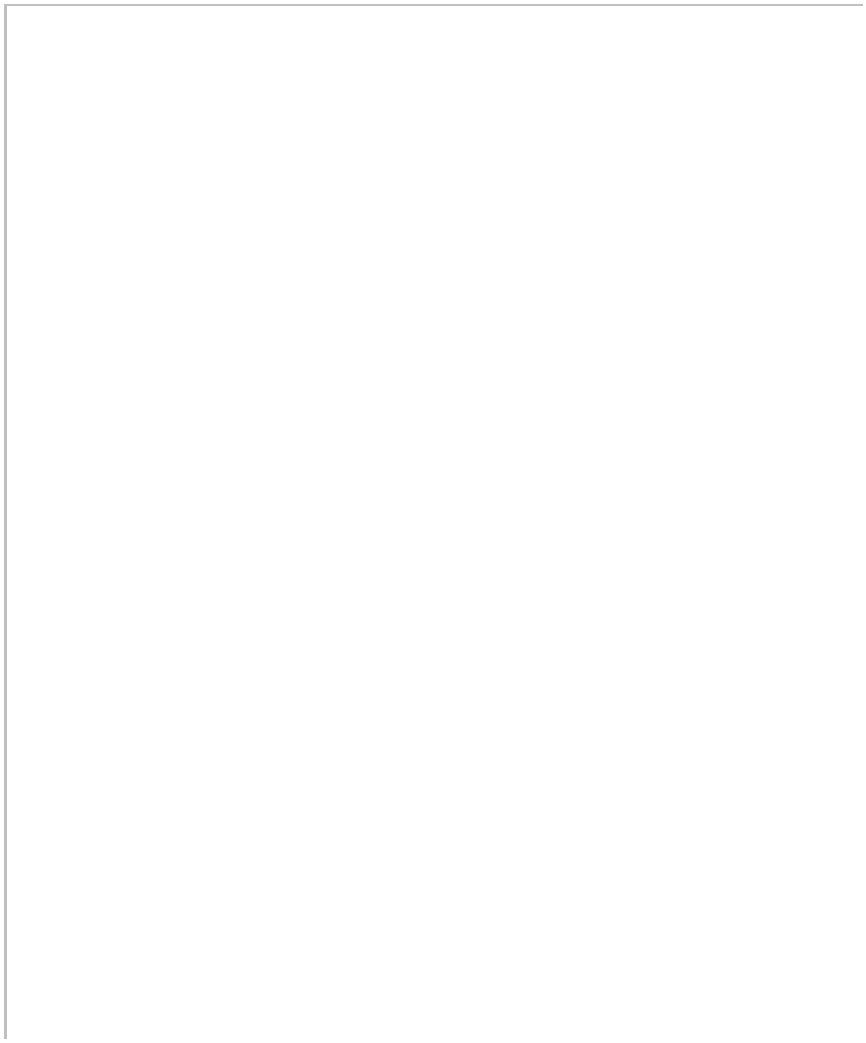
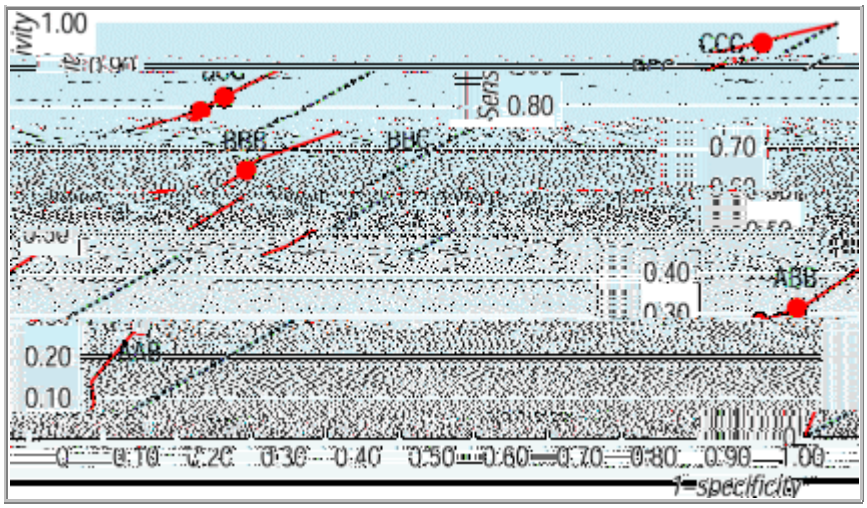


Figure C



Receiver operating characteristic curve for predicting doctors who drop off *Medical Register* AAB, ABB, etc, are different A level cut offs

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