by the fact that a senior lectureship in community medicine with special responsibility in primary and continuing medical care is to be established at the same time as the four foundation chairs. It is hoped to involve the professor of human reproduction and obstetrics, and eventually at least the professors of psychiatry, child health, and geriatrics (when these are appointed), in the teaching of community medicine and to

forge a close liaison between the division, the regional hospital board, and the local public health service.

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Young Doctors Aiming to Enter Different Specialties

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Summary: Specialty preferences were explored in relation to personality, sex, and examination performance of recent graduates at Edinburgh. Potential surgeons were almost exclusively male, and were not academically outstanding. They were more decided about their future career than any other group, and they were relatively low in anxiety level.

Many of the future hospital specialists (excluding surgeons) were women. They were the group least decided about their careers. Potential general practitioners tended to be more anxious in personality. They had failed more professional examinations than any other group. They read less than other groups, the few women among them being particularly non-studious.

Women doctors in general were less anxious, more impulsive and sociable, and less studious than the men. The impulsive and sociable doctors of either sex were less decided about their career plans than their relatively unsociable colleagues.

Introduction

The doctors whose career choices were followed fell into two classes and had started their medical studies in 1959 and 1960. They had been studied initially in their preclinical years and again intensively in their fifth (penultimate) year. This report deals with four dimensions of their personalities, with their academic records, and with their choice of career in 1966.

Methods

Sampling

The total sample was composed as follows: (1) All doctors who had been second-year Edinburgh medical students in 1961 and were citizens of the United Kingdom. They had registered as medical practitioners by December 1965; (2) A 50% random sample of doctors who had been third-year Edinburgh medical students in 1961 and were citizens of the United Kingdom. They had registered by December 1964.

Because of delays of some class members in graduating, due to failure or an extra year spent on an honours B.Sc., the 50% random sample was augmented by 12 replacements chosen at random from the remainder of that class.

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Survey

A postal questionnaire was sent in 1966 to the young doctors in the sample inquiring *inter alia* about the following:

- (1) specialty choice; (2) firmness of specialty choice—(a) definitely decided, (b) inclinations towards certain work, (c) decided against some kinds of work, (d) quite undecided;
- (3) reading habits—(a) seldom or never, (b) one hour weekly, (c) one hour daily, (d) more than one hour daily.

Personality and Academic Ability

Four dimensions of personality thought to be important in medical training had been tested when these doctors were in their fifth year at medical school (Walton, 1968a).

Neuroticism.—The scale for neuroticism on the Maudsley Personality Inventory is made up of 24 items measuring emotional instability. High scorers are considered anxious and prone to emotional disorganization under stress.

Extraversion.—The scale for extraversion on the Maudsley Personality Inventory is made up of 24 items which measure a person's outgoing social proclivities (Eysenck, 1959), consisting of sociability and impulsiveness. The high scorer or extravert is easygoing, wants numerous social contacts, and does not persist in activities for long. The introvert or low scorer is withdrawn and subdued, and is inclined to keep in the background socially and to remain quiet when in a group.

Complexity is measured by a scale of 27 items which test a person's liking for diversity and novelty (Walton and Hope, 1967). A high scorer has an open-minded experimental orientation, and is not discomfited when faced by ambiguity. The low scorer prefers sameness, seeks definite structure, and dislikes circumstances that are uncertain; he does not seek unusual experiences and tends to react against unfamiliar ideas (Centre for Study of Higher Education, 1962).

Mean Personality Test Scores and Academic Performance of Doctors in Specialty Subgroups

	Total	Surgeons	Hospital Specialists	General Practitioners
Neuroticism	17.73	14.37	18.05	20.24
Extraversion	27.43	20.70	26.16	29.00
Thinking-introversion ..	34.48	35.26	34.59	33.24
Complexity	12.39	11.81	13.18	11.90
Examination record ..	1.61	1.59	1.59	1.86
Medical school performance	4.48	4.70	4.45	4.57

Thinking-introversion is measured by an inventory of 67 items and assesses a person's degree of liking for abstract ideas (Walton, 1966). The low scorer prefers to act rather than reflect, and customarily expresses practical ideas. The high scorer likes to analyse his own motives and is more idealistic than realistic. The mean personality test scores of the sample are shown in the Table.

Two measures of academic ability were used.

Examination record was the number of failures in medical school professional examinations: no failures, one failure, two failures, failed more than twice.

Overall Medical School Performance.—All professional examinations marks were added, and total scores classified in eight categories.

The two measures of ability correlated well ($r=0.66$).

Response Rate

After mailing the questionnaires two reminder letters were sent—one at three weeks and one at seven weeks. Completed forms were returned by 120 doctors, representing 83% of the sample.

Characteristics of Total Sample

Personality Types

The young hospital doctors fall into two personality types. Some were anxious people who have a preference for abstract ideas. Other doctors can be distinguished who were emotionally stable and preferred practical ideas. The former type tends to be impulsive and sociable, and the latter more controlled and withdrawn socially. (The association between thinking-introversion and neuroticism scores was: $r=0.23$, $P<0.01$; and between thinking-introversion and extraversion scores: $r=0.18$, $P<0.05$).¹

Sex

Specialties were differentiated to a great extent by the number of women wanting to enter them (variance ratio $F_{4,114}=3.77$; $P<0.025$). Only one woman chose surgery, and few, while hospital doctors, chose general practice. Few wanted to enter laboratory medicine. Most wanted to become hospital specialists, usually selecting either paediatrics or obstetrics and gynaecology. Surgery was thus the most exclusively male preserve, followed by general practice; the other hospital specialties were shared between the sexes. Among the variables studied, sex was the one which most differentiated the specialty groups.

The female section of the sample was the more emotionally stable, the men being characterized by a higher anxiety level ($r=0.23$, $P<0.01$). The women doctors, furthermore, were more impulsive and outgoing socially than the men ($r=-0.28$, $P<0.01$).

The women hospital doctors did much less medical reading than the men ($r=-0.33$, $P<0.01$). Their relative lack of studiousness—at least so far as bookwork is concerned—was not what one would expect from their medical school achievement. These women, as was already apparent when the classes had been studied at medical school (Walton, 1968b), were academically superior to the men. Their intellectual lead was made plain by both measures of medical school success. Men more often failed professional examinations ($r=-0.25$, $P<0.01$), and mark for mark were worse overall medical school performers ($r=-0.32$, $P<0.01$).

These correlations deal with the case where both variables are continuous; other correlations reported deal with the case where a variable is dichotomous or ranked.

Differences According to Year of Entry

It is common knowledge that classes vary, selection of applicants being only one of the factors involved. The two classes were distinguished by striking personality differences. Those in the class qualifying in 1964 were higher in neuroticism—that is, they were more anxious persons than those of the next year ($r=0.22$, $P<0.05$). As well as being anxious, the 1964 graduates were less comfortable in conditions of uncertainty ($r=-0.24$, $P<0.01$). Anxiety is known to operate as a drive, so it is in line with expectation that the 1964 graduates were doing a greater amount of medical reading than the more stable, more flexible 1965 graduates ($r=-0.21$, $P<0.05$). Greater maturity, however, does not bring firmer career decisions. The 1965 graduates showed the same degree of uncertainty about their future careers as the more mature doctors a year their senior.

Firmness of Specialty Choice

Firmness of career decision was negatively associated with a personality characteristic, extraversion ($r=-0.27$, $P<0.01$). The impulsive and sociable young doctors busy interacting with other people were more undecided about their eventual specialty, while their controlled and socially withdrawn colleagues had come closer to making up their minds.

Characteristics of Each Specialty Group

The young doctors were classified according to the specialist fields for which they expressed preference as follows: surgeons, $n=27$; other hospital specialists, $n=61$; general practitioners, $n=21$; social medicine, public health, and administration, $n=5$; laboratory doctors and anaesthetists, $n=6$. The numbers of the last two groups were too small for detailed analysis.

Surgeons

The 27 potential surgeons were the least anxious group, their mean neuroticism score being only 14.37 (see Table). They were also more outgoing socially than the sample as a whole. They were just below average in reflectiveness, and their tolerance of uncertainty was also slightly below average.

Within the group of surgeons there was a positive correlation between extraversion and complexity scores ($r=0.45$, $P<0.05$), so that the impulsive and sociable surgeons tend to be able to tolerate ambiguities, while the unsociable surgeons are more eager for certainties.

The doctors in this almost exclusively male preserve were not academically distinguished. Though they had failed only as many examinations as the hospital specialists, when the criterion was total professional examination scores they ranked as the least successful group.

Future surgeons read more medical literature than intending general practitioners. Surgeons who had shone academically at medical school were more firm in their choice of specialty than those who performed less well ($r=0.45$, $P<0.05$). As a group the surgeons were the most firmly decided about their career choice.

Other Hospital Specialists

The hospital specialists (excluding surgeons) were no more anxious than was average for the sample as a whole (see Table). They were slightly less outgoing socially and less impulsive than was average. They were more comfortable in uncertain conditions, their mean complexity score being above the mean score for the sample.

While the hospital specialists as a group conformed closely to the average personality of the total sample, within the group some personality dimensions correlated. Neuroticism correlated positively with thinking-introversion ($r=0.31$, $P<0.05$) and also with complexity ($r=0.28$, $P<0.05$). Moreover, thinking-introversion correlated with extraversion ($r=0.31$, $P<0.05$), indicating that doctors in this group who were abstract in outlook were also impulsive and sociable, while practically minded hospital specialists tended to be more controlled and withdrawn.

Thus among the hospital specialists two different personality types could be discerned. One type was anxious, reflective, tolerant of uncertainties, and impulsive and sociable; the other type was emotionally stable, practically minded, intolerant of uncertainties, and unsociable.

One of the personality dimensions, extraversion, was related to academic ability: the impulsive and sociable doctors in this group had passed more examinations at medical school ($r=0.26$, $P<0.05$). Two other personality factors were related to firmness of career decision: the more anxious ($r=0.30$, $P<0.01$) and the more abstract in outlook the hospital specialist the greater his uncertainty ($r=-0.28$, $P<0.05$). Definite career decisions were common among hospital specialists who were emotionally stable and practical in outlook.

There were proportionally more women in this subgroup—23 among the 61 hospital specialists—than in the total sample. The women read much less ($r=-0.33$, $P<0.01$) than the men. While the hospital specialists as a group read no more than the sample as a whole, the firmer a doctor's career decision the more he read ($r=-0.33$, $P<0.01$).

General Practitioners

Intending general practitioners seemed to be more anxious people than the sample as a whole (see Table). There were proportionally fewer women—only 4 among the 21 potential general practitioners—than in the total sample. The few women in the subgroup were more sociable than the men ($r=-0.43$, $P<0.05$), and also superior academically ($r=-0.43$, $P<0.05$), giving an intellectual boost which this group otherwise lacked. General practitioners most often failed professional examinations while at medical school (see Table), a trend previously reported (Last *et al.*, 1967). The future general practitioner reads relatively little, but the women read much less than the men ($r=-0.72$, $P<0.01$). It may be that already the young women doctors were more preoccupied with duties outside

medicine than were their male counterparts. The general practitioners were rather more decided about their careers than the sample as a whole—more so than hospital specialists but less so than surgeons.

Discussion

Personality differences among young doctors are of relevance to those interested in predicting the future careers of medical students, to those who offer career advice or vocational counselling, and to members of appointment committees who are influenced by personality attributes when interviewing candidates. Progress in this field must await further analysis of specialty role in terms of personality type.

The sex of the doctor and the performance in medical school predict specialty choice better than personality factors. Among young doctors as a group, and also within specialty subgroups, doctors of contrasting personality type are found. Even among potential surgeons, for example, who tend to be homogeneously impulsive, sociable, and stable emotionally, the more sociable surgeons tend to tolerate uncertainties better than the less sociable; the latter tend to strive for certainties. Simple personality classification of specialists, therefore, is not to be expected.

Surgery is staffed almost wholly by men. Young women doctors do not aim to enter general practice in any numbers. While women do better academically at medical school than men, they do much less medical reading subsequently. This implies that soon after graduating women are already falling behind in the theoretical part of their professional programme, a finding that has obvious implications for postgraduate education of women doctors.

We wish to thank Dr. Keith Hope for his statistical help. Requests for reprints should be made to Dr. H. J. Walton.

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CONFERENCES AND MEETINGS

Physical Fitness—R.S.M. Symposium

[FROM A SPECIAL CORRESPONDENT]

A symposium on "The Meaning of Physical Fitness" was held at the Royal Society of Medicine, London, on 4 June, with Sir HECTOR MACLENNAN, the president of the Society, in the chair. Opening the morning session Dr. ROGER BANNISTER (London) thought that, though exercise was essential for health and wellbeing, nobody should be stampeded into performing boring routines in the name of physical fitness. Since a child's mental performance could be enhanced by physical activity, it was hoped that similar considerations applied to the adult.

Physiology of Exercise

Discussing the physiological aspects of physical effort and exercise, Professor ERLING

ASMUSSEN (Copenhagen, Denmark) said that the most important physiological criteria of physical efficiency were mobility, muscle strength, anaerobic power, aerobic power, endurance, and neuromuscular co-ordination. Muscle was built up of smaller and larger motor neurones, the smaller supplying motor units of predominantly slow red muscle fibres, the larger supplying large motor units of predominantly fast white muscle fibres. The low-threshold motor neurones were used under ordinary conditions, whereas the larger high-threshold motor neurones came into play when very strong or maximal contractions were needed. If the latter never occurred some degree of atrophy resulted, thus causing a decrease in physical fitness. Red and white muscle fibres might be called upon under quite different conditions of work and might

be selectively trained and selectively kept fit. The most widely studied and most popular criterion of physical fitness was the maximum aerobic power, which could be measured with considerable accuracy. During moderate exercise a mixture of carbohydrate and fat was metabolized, but when exercise was excessive more and more carbohydrate was used. The endurance-trained athlete utilized more fat and his muscle glycogen stores were greater. Physical fitness also depended on a high degree of muscular co-ordination.

Mr. BRIAN LLOYD (Oxford) had developed an equation for the energy balance of a runner. The energy needed to cover a given distance depended on the maximal aerobic power of the whole body, the oxygen debt, body metabolism, the kinetic energy stored in the running body, the external work done