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The social class of medical students

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Summary

It is suggested, by means of a simple model, that the excess of medical students from social class I cannot be satisfactorily explained in terms of either social class differences in intellectual ability, or the excess of medical students from medical families.

Key words: *SOCIAL CLASS; *STUDENTS, MEDICAL/psychol; EDUCATION, MEDICAL, UNDERGRADUATE; INTELLIGENCE; MODELS, THEORETICAL; FAMILY; GREAT BRITAIN

Introduction

The social class distribution of medical students is strongly weighted towards I and II (Cruickshank & McManus, 1976), as is shown in Table 1, from the Royal Commission on Medical Education, of 1968 (Royal Commission on Medical Education, 1968). This unrepresentative distribution may reflect the higher intellectual capacity of groups I and II, an unrepresentative pattern of application, bias in selection against children from lower social groups, or a combination of these factors.

In this paper I will present a simple model which allows one to make predictions of the effects of different intellectual capacities, and also allows for the known preponderance of children from medical families.

Social class differences in intellectual capacity

I will assume for the purpose of this model that intellectual ability can be defined entirely in terms of a single score (with population mean 100, and standard deviation 15), and that anybody with a score of above a certain threshold, is capable of being trained as a doctor; clearly more sophisticated models could be fitted, but the present model is closely related to that presented in a different context by Halsy, Heath & Ridge (1980). Children from different social classes have different distributions of ability scores and these are shown in Table 2. If we assume, for an example, that the threshold for medical training is 120 (i.e. 1.33 standard deviations above the mean) then, by assuming a normal distribution of ability within each of the social classes, we may calculate the proportion of each social class that would be expected to be above the threshold (column iv of Table 2) and hence the expected social class distribution in a population selected to be above this threshold (column v).

The calculations of Table 2 may be repeated for any threshold and Fig. 1 shows expected values for thresholds from 80 to 150. Figure 1a shows the percentage of each social class, and of the total population, who would be expected to be above particular thresholds. Fig. 1b shows the expected

TABLE 1. Social class of medical students [First Year, 1966, from Royal Commission on Medical Education (1968) Table 15A] and of the general population [Census, 1961, quoted in Royal Commission on Medical Education (1968)]

Social class	Medical students $n=2131$	General population
I	39·6%	2·8%
II	36·1%	15·5%
III	21·7%	49·9%
IV & V	2·5%	31·8%

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TABLE 2. The proportions (Column i), observed means and standard deviation on an ability score (Column ii and iii), expected percentages with ability scores greater than 120 (Column iv), and the expected proportions in a population with ability greater than 120 (Column v) of 12079 eleven year old children from the National Child Development Study, by Registrar-General's social class group of the father when the child was aged eleven. The ability score is a composite based on reading, mathematics, verbal and non-verbal abilities, and is described elsewhere (McManus and Mascie-Taylor 1981). The social class proportions differ from those in Table 1 since they are based on a different reference population

Social class	(i) Percentage in population	(ii) Mean ability score	(iii) sd of ability	(iv) Percentage >120	(v) Percentage in selected group
I	5·5	111·7	13·8	27·5	14·4
II	18·4	107·7	14·6	20·1	35·0
III	52·6	98·8	15·2	8·3	41·4
IV	17·5	94·9	14·9	4·7	7·7
V	6·0	89·6	15·5	2·5	1·5
Total	100·0	100·0	15·0	9·1	100·0

social class distribution of those selected based upon particular thresholds, and Fig. 1c shows the expected mean ability scores of those selected. The column marked A at the right-hand end of Fig. 1b represents the population proportions of the social classes and the column marked C represents the social class distributions of medical students. It is immediately apparent that whatever the level of intellectual threshold chosen it fails to predict the observed distribution of medical students. It is unlikely that minor changes in the data of Table 2 due to measurement of a different cohort of individuals, or measurement at a different age, will substantially alter Fig. 1.

We may determine an appropriate threshold in several ways. First, an upper limit may be set by assuming the unlikely circumstance that the 2522 medical students entering medical school in 1966 had the highest ability scores of their cohort of 905 000 born in 1948. These 0·27% of the population would then have a threshold of 141·7. Secondly, we may note from the Oxford Mobility Project (Halsey, Heath & Ridge, 1980), that 8·5% of the population born in the years 1943–1952 went to university, suggesting a threshold of 120·5. Since only minimal differences in the intelligence of medical and non-medical students have been found (Heim, 1972), a similar threshold may be assumed for each group. Finally, Matarazzo (1972; Matarazzo & Goldstein, 1972) found that in America the median IQ of medical students is 125·5, and that this value appears to be fairly stable, and consistent with the finding (Gibson & Light, 1967) amongst Cambridge University scientists of an average IQ of 126·5. A threshold

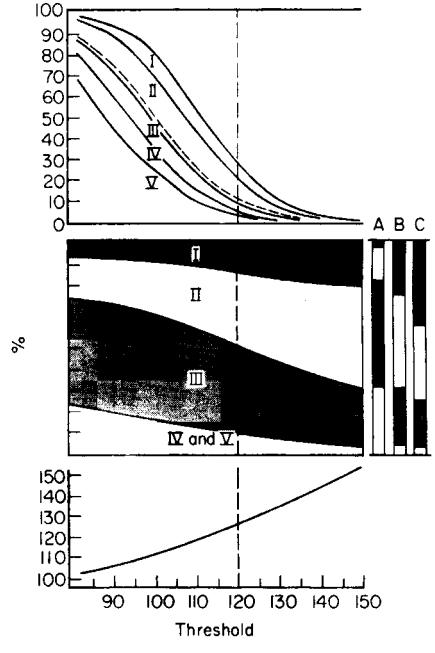

FIG. 1. The top section shows the percentage of children from each social class who will be expected to have ability scores above particular thresholds. The dotted curve gives the proportions for the population. The middle section shows the expected social class distributions amongst individuals who are above particular thresholds. The bottom portion shows the expected mean ability score amongst those who are above particular thresholds. The vertical dashed line indicates a threshold of 120. Column A represents the population proportions of the social classes (Table 2). Column C shows the social class distribution of medical students (Table 1), and Column B shows the social class distribution of medical students from non-medical families.

of 120 predicts a mean ability score amongst those selected of 126·6. In summary, a threshold of 120 for medical education seems to be acceptable, and given such a threshold it is clear from Table 2 that the expected distribution is very different from the observed distribution of Table 1.

The influence of medical families

It is well recognized that a high proportion of medical students are themselves the children of medical fathers (21·2% in the data of Table 1). Since these individuals all come from social class I (by definition), it is possible that the social class bias may be explicable entirely in terms of an excess of doctor's children being admitted to medical school.

In 1966 there were 107 717 doctors on the General Medical Council's Register. Extrapolating backwards from data for 1972–1979, then about 22% of these would have been on the overseas list (had it existed), and hence about 84 000 would be resident in the U.K. Assuming that 16% of doctors were women (Royal Commission on Medical Education, 1968, para. 355) then in 1966 there were approximately 70 500 male doctors. In 1971 there were 677 000 social class I families in Great Britain (including those with no children, and based on the occupation of the head of the household), and hence about 10·4% of social class I families were medical, as compared with a 53% incidence of medical fathers amongst social class I medical students. Assuming an excess of medical students with medical fathers (albeit, perhaps arising from a preferential application rate of such individuals), then the data of column C may be adjusted to remove these effects (Column B of Fig. 1b). The distribution is now much closer to the expected distribution for a threshold of 120, but still shows an excess of classes I and II. We must therefore conclude that there are two disproportions, one in favour of the children of doctors and the other in favour of social classes I and II.

Although the analysis so far has been in terms of those students entering medical school in 1966, it is unlikely that since then there have been any substantial changes in the social class proportions. The social class distribution amongst Cambridge medical students remained unchanged from 1961 to 1977, and in Birmingham over the same period there was an increase in the proportion of social class I students (McManus, 1977). Recently UCCA have reported that over the years 1975–1979 a decreasing proportion of university students as a whole came from lower social classes (Universities' Central Council for Admissions, 1979).

Discussion

The model described above makes several assumptions, all of which could be improved with more sophisticated models, but none of which are likely to alter radically the main finding that taking note of social class ability differentials and of the predominance of students from medical families does not account for the excess of social class I and II students in medical schools. Several points need analysing further:

(i) The majority of studies have used self-report of social class and/or father's occupation, perhaps resulting in a tendency for individuals to over-report father's social class, and thus raising the apparent proportion of higher social classes. This effect is unlikely to be substantial, or to account for the disproportions.

(ii) It is assumed that exceeding a simple threshold of intellectual ability is sufficient to ensure success at medical school. Whilst other factors are also likely to be of importance (e.g. personality differences, etc.), unless these factors are differentially distributed amongst the social classes then they should not affect the above conclusions.

(iii) In recent years there has been a tendency to carry out selection of medical students principally, or in some cases, entirely, by asking for higher and higher A-level grades. Assuming that A-level grades relate to the intellectual ability score described above (and the association may well not be very strong) this mode of selection will result in a further increase in the predominance of social class I students, by raising the necessary threshold above an appropriate level. Recent results from the Oxford Mobility Project suggested that a major causal determinant of A-level success is not ability but social class, (Halsey, Heath & Ridge, 1980) thereby exacerbating the above effect.

(iv) The overall discrepancies between the observed and expected social class distributions may be due to several other factors. An obvious cause of concern is the possibility that children from social classes IV and V are subject to discrimination by medical schools. This possibility may be examined only by means of a prospective study of medical student selection and this is in progress at present

at St Mary's Hospital Medical School. A social class disproportion might also arise due to discouragement, either by schools or parents, of applications for medical school from lower social class children or due to such children finding that they hold inappropriate qualifications and are thus unable to apply (Jackson & Marsden, 1966). Halsey, Heath and Ridge (1980) have recently suggested that indeed much, but not all, of the class bias in university education may be attributable to biasses arising before application to university, during the ages 7 to 18 in primary and secondary education.

(v) If the threshold for a medical training is 120, then only about 28% of children from social class I families will attain that level. This is probably true of medical families also, despite the fact that we may assume that at least one of the parents probably exceeded the threshold. The tendency for children of high ability parents to be of relatively lower ability is known as regression to the mean, and is well recognized in studies of abilities. The presence of a medical parent does not therefore confer a particularly high likelihood of a child being above the necessary threshold, and cannot be construed as a reason for preferential selection.

(vi) In the above model, no assumptions have been made as to whether the differences between social classes are genetic and/or environmental in origin. The values of Table 1 have been derived empirically, being based on actual performance in a series of tests, and make no statements as to innate, potential or maximum abilities of the children. Naturally any substantial changes in those values, for whatever reason, would require a recalculation of the expected proportions in each social class group.

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