11: The culture of medical students: correlates and changes.

"He complained that the young medical men were uneducated; their reading consisted of The Sporting Times and the British Medical Journal"

Somerset Maugham, Of Human Bondage.

"Medical education consists not merely in the acquirement of scientific and clinical knowledge, but in the general cultural development of the mind and physical development of the body".

Zachary Cope, The History of St. Mary's Hospital Medical School.

Summary.

The correlations of five measures of culture with a number of social and educational background factors, and with the Eysenck Personality Questionnaire are described in the St. Mary's study of applicants to medical school. In the Birmingham study the cross-sequential design is used to study change in culture as a function of age, years in medical school, and cohort of entry.

In the previous chapter the development of a set of scales for measuring the cultural behaviour of medical students has been described. Factor analysis of the responses to ninety separate questions on a questionnaire, derived five orthogonal factors and a single higher-order factor, a brief summary of which is given below. The factors were named as followed :-

1. Literary Culture. This factor loaded heavily on quality books, particularly non-fiction of a philosophical nature.

2. Low-Brow Culture. This factor loaded more heavily on lighter novels and hardly at all on non-fiction books, except for a few more popular authors. It tended also to relate to the quantity of reading rather than the quality. It could perhaps be summarised as 'Railway-bookstall reading'.

3. Travel. This factor loaded only on travel items, and in particular on places for which travel might be described as 'recreational' rather than functional; i.e. the countries of Europe and of North America, and excluding most of the Third World, which countries had far lower loadings.

4. Popular culture. This factor has strongest loadings on sporting activities, watching television, going to a pub, football and cricket matches and parties, and cinema and pop concerts. The tabloid newspapers have high loadings. The few authors with positive loadings are unashamedly at the lower end of the market.

5. Non-literary culture. High loadings indicate a high proportion of time spent on hobbies, in particular music. High scorers are more likely to attend theatre, opera,

ballet, classical music concerts, art galleries and museums, and are more likely to read the weekly magazines.

C: 'Culture'. Factor C is a higher-order factor which accounts for 42.7% of the common variance in factors 1 to 5, and has positive correlations with all factors except factor 4, for which there is a negative correlation. The factor broadly assesses culture in all its manifestations.

Scores were calculated for each subject on each factor by the SPSS FACTOR program (Nie et al, 1975), the scores being approximately normally distributed with a mean of zero and variance of unity when considered across all subjects in the original sample. In general there have been almost no studies of the cultural pursuits of doctors, with the exception of brief anecdotes. The only relevant study in an allied profession is that of Borkman et al (1981), in their study of the 'recreational and community' activities of US dentists. Their conclusion, of an "overwhelming preference for sports and physical activities in comparison with intellectual, cultural or artistic hobbies" sounds as if it might be broadly appropriate for the conventional stereotype of medical students, although their study was not particularly sophisticated and may well have missed many cultural activities.

In the present chapter it will be asked how background social factors relate to culture scores, how personality correlates with culture, and how culture scores change as individuals pass through medical school.

Background correlates of culture scores.

The St. Mary's study was used to examine the relation of background variables, including selection itself, to the culture factors. The analysis is therefore an extension of that reported in chapter 6.

Method.

Table 11-2 summarises all of the variables which were felt to be of interest. The variables of table 11-2 are often inter-correlated (for instance coming from a medical family correlates with high social class and attending private sector schools). Relations of the culture scores to background factors were therefore examined by a hierarchical multiple regression technique, using the NEW REGRESSION package of the SPSS program suite (Hull and Nie, 1981), in which at each step of the analysis that variable was entered which increased the multiple correlation by the greatest amount, the contributions of all previously entered variables having been taken into account. The analysis continued until no additional variable could produce a significant improvement in the multiple correlation at the 0.05 level.

Results.

Table 11-1 shows, for each of the five orthogonal factors, and the higher-order factor, C, the results of a hierarchical multiple regression on the background variables of table 9-1. In all cases a highly significant multiple regression is found ($p<0.001$ in all cases). For each variable in each analysis is shown the order of entry into the analysis, the significance of the improvement in fit as a result of the entry of that variable, and the beta coefficient in the final regression

equation.

From table 11-1 it can be seen that cultural factors differ in their pattern of correlations with background variables. Thus social class manifests only on factor 3, Travel, while a private sector education seems only to relate to factor 1, Literary culture. Female applicants score more highly on factors 1, 5 and C, score less on factor 4, and show no differences on factors 2 and 3. Older applicants score more highly on factors 1,2,3 and C, but not on factors 4 and 5. Factor C has the largest number of correlates, reflecting its relation to all of the five orthogonal factors.

In general the background factors account for between 9 and 29% of the total variance in culture scores between individuals.

Discussion: Background correlates of culture scores.

The pattern of correlations of each of the culture scales with the background factors is different, suggesting that separate causal mechanisms are in operation. Social class might be expected to have a dominant effect upon culture, although that its effects appear relatively small in the present study could be a result of the rather restricted social composition of the group (chapter 3). Social class has its clearest effects on Travel, which effects are probably a simple result of differences in income. Of other obvious correlates of social class, a private sector education (i.e. the applicant has attended a 'public' school) relates only to factor 1, Literary culture; this could either be due to the specific teaching of these schools, or alternatively could be a result of the leisure habits of those students who are boarders, the long evenings being whiled away in reading (and indeed there is a

tendency for those private sector students who have been boarders to have a higher score in factor I (n=52; mean=0.271) than those who have not been boarders (n=108; mean=.071; t=1.62; p=.054, one-tailed)). Other schooling factors have relatively little influence upon culture, the single exception being that those applicants from sixth forms which send a greater proportion of students to university tend to be more cultured in general. These results are in clear contrast to the effects of schools upon attitudes, which are more extensive (chapter 9). Scores show some relation to the O- and A-level results of applicants, although the pattern is not easily interpretable. Differences between the sexes are large, and not particularly unexpected, particularly for factors 4 and 5. The manner of application of the students to medical school shows some correlation with culture, those who have placed less medical schools on their UCCA form (i.e. they have made some non-medical choices) tending to score more highly on Literary culture and on the general culture scale. That medical schools tend preferentially to select students who have made all their choices for medicine might result in an intake with lesser general cultural interests. Those applicants not accepted by any medical school tended to have higher scores on factors 5 and C; this is difficult to interpret but might suggest that schools tend to select narrower specialists rather than generalists. Finally, an important correlate on factors 1, 2, 3 and C is the age of the applicant, older, more mature applicants scoring more highly. To a large extent such correlations simply reveal that the culture scores have a large cumulative component within them. That point will be considered further in the next discussion section.

Changes in culture scores.

Culture may change as students pass through medical school, either as a result of the direct influence of the medical school (and of its sub-cultural 'ethos') or as a consequence of the process of student maturation, since students also grow older as they pass though the medical school. In addition transverse studies of students might be confounded by long-term changes between cohorts of students. The second analysis, of students in the Birmingham study, studied the effects of these factors in a similar manner to that described in chapter 9 for ethical attitudes.

The study used a modified cross-sequential design (Schaie, 1965) in which students in all the five years of the medical school were assessed in October 1977. First year students were then assessed in October 1978, 1979 and 1980, and then in October 1981 a second transverse study of students in all the five years was carried out. Following the advice of Baltes et al (1977) the separate effects of year of medical school study and cohort of entry have been studied, since the main interest is in ontogenesis (and thus the year of testing effects have been ignored). Year of medical school confounds the number of years the student has spent in the medical school with his age; however since these two items are not perfectly correlated it is possible to enter both into the model and thereby examine the independent effects of each explanatory variable.

Method.

Statistical analysis for significance of effects was by means of the SPSS ANOVA program (Nie et al, 1975; Hull and Nie, 1981). Effects of age (A), years in medical school (M), and cohort of entry (C) were examined. In order to test the effect of A a main-effects model was fitted as the first stage of the analysis, all possible levels of M and C being represented by dummy variables. At the next stage the linear component of A was added to the model and its significance assessed by the improvement in the fit of the model. Non-linear trends were examined in the third stage by simultaneously adding into the model the quadratic, cubic, quartic and quintic effects of A and examining the improvement in the goodness of fit of the model. Similar procedures were used to test the independent effects of M and C.

In view of the multicollinearity of A, M and C, estimates of effect sizes were obtained by the method of ridge regression (Price, 1977). A main effects model of A, M and X was fitted in which each level of each explanatory variable was represented by a dummy variable. Empirically it was found that a value of K of 0.345 reduced the mean variance inflation factor to unity, and this value was used in computing the ridge regression estimates for each of the dummy variables.

Results.

Figure 11-1 shows the ridge estimates of effects for each of the five orthogonal variables and the higher-order factor, C, for the independent effects of age, years in medical school and cohort of entry. The significance of linear trends is indicated alongside each of the graphs by asterisks. Unless otherwise stated in the text, non-linear

effects are non-significant.

Factor 1: Literary culture. This factor shows a slight increase with years in medical school, and shows no significant relation to age or cohort.

Factor 2: Low-brow culture. This factor shows a highly significant increase with age, both linear ($p<0.001$) and non-linear ($p<0.001$), the latter implying curvilinearity in the relationship. There is no effect of years in medical school, but there is a significant downwards trend with cohort of entry, more recent entrants having lower scores.

Factor 3: Travel. This shows significant increases with both age (linear: $p<0.001$; non-linear: $p<0.05$) and with years in medical school (linear $p<0.05$; non-linear: not significant). There is no cohort effect.

Factor 4: Popular culture. This factor shows no independent relations to age, years in medical school or cohort of entry.

Factor 5: Non-literary culture. This factor shows a significant linear downwards trend with age, and no relationship to years in medical school or cohort of entry.

Factor C: 'Culture'. This factor shows a highly significant effect of age (Linear: $p<0.001$; non-linear: $p<0.001$) and a linear effect of years in medical school ($p<0.05$), with no effects of cohort.

It thus seems that age has the largest effects upon cultural behaviour, most factors increasing with age, although non-literary culture shows a decline, and factors 1 and 4 shows no significant change with age. Medical schooling does have some independent effects upon cultural behaviour, in particular on factors 1, 3 and C, although none of the effects achieve very high levels of significance. Cohort effects are seen only in factor 2, Low-Brow culture, those students entering towards the end of the period 1973-1981 tending to have lower scores.

Multiple correlations of the five orthogonal factors and of C with age, years of medical schooling and cohort were .256 ($p<.001$), .411 ($p<.001$), .309 ($p<.001$), .142 (NS), .247 ($p<.001$) and .382 ($p<.001$) respectively. Thus these three explanatory variables could account for between 6.1% and 16.9% of the total variance in factors 1, 2, 3, 5 and C. Factor 4 showed no evidence of a relationship to the explanatory variables.

Discussion: changes in culture scores.

The behaviour of medical students may change as they pass through medical school either because they are being influenced by the university and its cultural milieu, or simply because they are growing older. The results shown above sugest that both processes are occurring. Both age and years at medical school have independent significant effects upon the general cultural factor, C. For the more specific orthogonal factors a different pattern emerges. Neither age nor year of study substantially affects the development of factors 4 and 5 (Popular culture and Non-literary culture). Both are, to a greater extent than some of the other scales, 'state' measures (see chapter 10) and thus are not embarassed by the absence of a general increase. Factors 1, 2 and 3 are all cumulative (in that they integrate across all past behaviour), and all show substantial changes with age or years in medical school. Literary culture shows an effect only of years in medical school, suggesting that change is occurring as the result of being exposed to a university environment, rather than due to simple maturation. By contrast factor 2, Low-brow culture, shows a relation only to age, and not to year in medical school. Travel, factor 3, shows independent effects of both age and year in medical school.

The methodology used in this study also allows the detection of long-term cohort differences in entrants to medical school. Linear trends were only significant for factor 2, Low-Brow culture, which decreased over the period 1973-1981, although there were suggestive trends in several other factors. The reason for any such changes are not at all clear and would need to be extended by further study before explanations were attempted. A particular possibility with factor 2 is that a number of the authors considered are relatively ephemeral in their popularity and hence they had gone out of fashion by the time that more recent cohorts were entering the study. Such transient popular interests impose moderately severe methodological constraints on any study of culture.

Culture and Personality.

Cattell and Warburton (1967) have suggested that the assessment of 'High-brow tastes', 'Reading preferences', and 'Book preferences' may be regarded as an 'objective' test of the personality dimension of U.I. 16 ("Narcisstic ego vs secure, disciplined unassertiveness"). However Kline (1983) has pointed out that such a test has several criticisms; it is 'transparent', in that an individual might guess the nature of the scale being assessed, and it is patently not culture-free. Despite the criticism of such scales as personality assessments per se, there still remains the important question of whether cultural behaviour relates to personality in general.

Method.

The St. Mary's Study administered the EPQ (Eysenck Personality Questionnaire: Eysenck and Eysenck, 1975, 1976) to all interviewees immediately after they had been given questionnaire 2 (Q2) of that study, which contained culture and attitude scales.

Results.

The distributions of personality scores of the applicants have been described in chapter 6 and show that applicants have higher extraversion and lie scores, and lower neuroticism and psychoticism scores than the general population.

Table 11-2 shows Pearsonian correlation coefficients between the four personality dimensions (E: Extraversion; N: Neuroticism; P: Psychoticism; and L: Lie) and the five orthogonal culture scores and the general cultural factor.

Extraversion shows significant positive correlations with cultural factors 1, 3, 4, 5 and C. Neuroticism shows no correlations with any of the cultural factors. Psychoticism shows positive correlations with factors 1 and 4 and a negative correlation with factor 5. The Lie scale shows negative correlations with factors 1, 3, 4 and C.

Discussion: Culture and Personality.

From table 11-2 it is clear that the five orthogonal culture scores each tends to show a specific pattern of correlation with the four personality scores. Four of the five orthogonal factors show correlations with extraversion, as does the overall scale, C. These

results provide no support for the popular view of the 'bookish' person as introverted and withdrawn. Neuroticism shows no relation to any of the cultural scales, which is perhaps at odds with the popular image of the cultivator of the arts as an overly sensitive individual.

The most difficult personality dimensions to interpret are psychoticism and the lie scale. Psychoticism shows the strongest relation to popular culture, which is consistent with the mildly psychopathic behaviour frequently associated with drinking and sport (at least in medical student sub-culture). The correlation with literary culture is obscure, but could conceivably be interpreted as a preference for books rather than for people. The negative association of psychoticism with non-literary culture may be due to factor 5 containing an emphasis on cultural production of music and other arts (rather than just their passive reception), and for this a greater degree of stability (and hence lower psychoticism scores) may be beneficial. A further difficulty in interpretation of the correlates with psychoticism is that the underlying structure of extraversion and psychoticism in the Eysenckian schema appears to be changing (See McManus and Weeks, 1982; McManus, 1983), such that items which in previous versions of the Eysencks' scales would have been scored as extraversion (to do with impulsivity) are now included in the psychoticism scale, and extraversion has become a purer measure of sociability.

That the lie scale shows correlations with three of the five orthogonal scales and with the general scale might at first sight suggest that the culture scales are simply unreliable or subject to social biasses, due to dissembling by the applicants. However that interpretation must be rejected since in all cases the correlations are negative; that is, those with the highest lie scores report the least

degree of involvement with those activities for which there is maximum social kudos. It is of course possible that, at the time of their interview, these prospective students perceive the dominant ethos of the medical school as anti-cultural, but this would be inconsistent with the medical school prospectus, which stresses extra-curricular activities, and with the measured attitudes of the students as a whole, who rate St. Mary's most highly of all schools in extra-curricular activities (Wakeford, 1983). Finally, it would seem that if mere social acquiescence in the perceived norm were the reason for these correlations, then factors 2 and 5 would also show such correlations, but there is in fact no evidence for such relations. Perhaps the best interpretation is to follow Crookes and Buckley (1976), Kirton (1977), Massey (1980) and Eysenck and Eysenck (1976: pp 160 - 170) and accept that the the L scale is more interesting than being simply a measure of a tendency to distort the responses to questions in response to perceived norms, but is rather an independent measure of personality in its own right, high scorers perhaps not being regarded as dissemblers but as "lacking insight or self-awareness", "inaccurate, uninsightful but honest self-assessers", or "conformists". Certainly any of these views would be compatible with the negative correlations between the L scale and the culture scores, and would suggest that the L scale should have its own predictive correlates with behaviour. A final, more tenuous, possibility is that the relation between culture and the L scale is indeed causal, but in the opposite direction to that implied in the above discussion, and that one of the effects of cultural activity is to encourage honesty in self-evaluation, and hence to produce lower L scores in those with greater cultural activity.

The present results support Cattell and Warburton's contention that 'High-brow tastes' are related to personality assessment, although there is no evidence for the specific suggestion that the major correlate is a factor (U.I. 16) "expressing competitive striving for excellence in any performance" (Cattell and Kline, 1977), partly due to it not being at all clear how U.I.16 would emerge in the EPQ assessment. Furthermore as Cattell and Kline (1977) state, the suggestion that "vanity and competitiveness are the roots of high-brow factors in [their] American sample" may well be a result peculiar to American culture.

Discussion: General.

The correlations demonstrated in the present study with the cultural factors of chapter 10 suggest that the measurement of cultural behaviour is potentially a useful addition to the description of individual differences. That the five orthogonal cultural factors each tends to show a different pattern of correlates provides good support for their factor analytic separation. It is of course possible that a more extensive study would allow further factors to be identified.

The ability to measure the culture of individuals should allow more precise empirical study of suggestions that psychometric tests, particularly of intelligence, are 'culture-free', and should also be useful in the development of more general theories of cultural evolution (Cavalli-Sforza and Feldman, 1981) and of gene-culture co-evolution (Lumsden and Wilson, 1981). Cultural activity has also been credited with influencing the attitudes and the religious views of individuals, and these possibilities will be specifically considered in chapter 13.

Figure 11-1. Shows estimates of independent effects of age, year of study and cohort of entry to medical school for each of the five orthogonal cultural attitudes, and for the overall culture factor. Each individual graph shows the effect size as estimated from ridge regression coefficients (see text). Points are only plotted if at least 50 individuals contributed to the point. Sample sizes in the total sample are shown across the top of the columns. Significance levels for linear trends are indicated alongside data sets (*: $p<0.05$; **:$p<0.01$; ***: $p<0.001$; No indication: Not significant). The ordinate is in standard deviation units with respect to the entire reference population (see text). Since points within individual graphs are only plotted relative to one another the absolute position of individual graphs is arbitrary, and has been adjusted for display purposes.

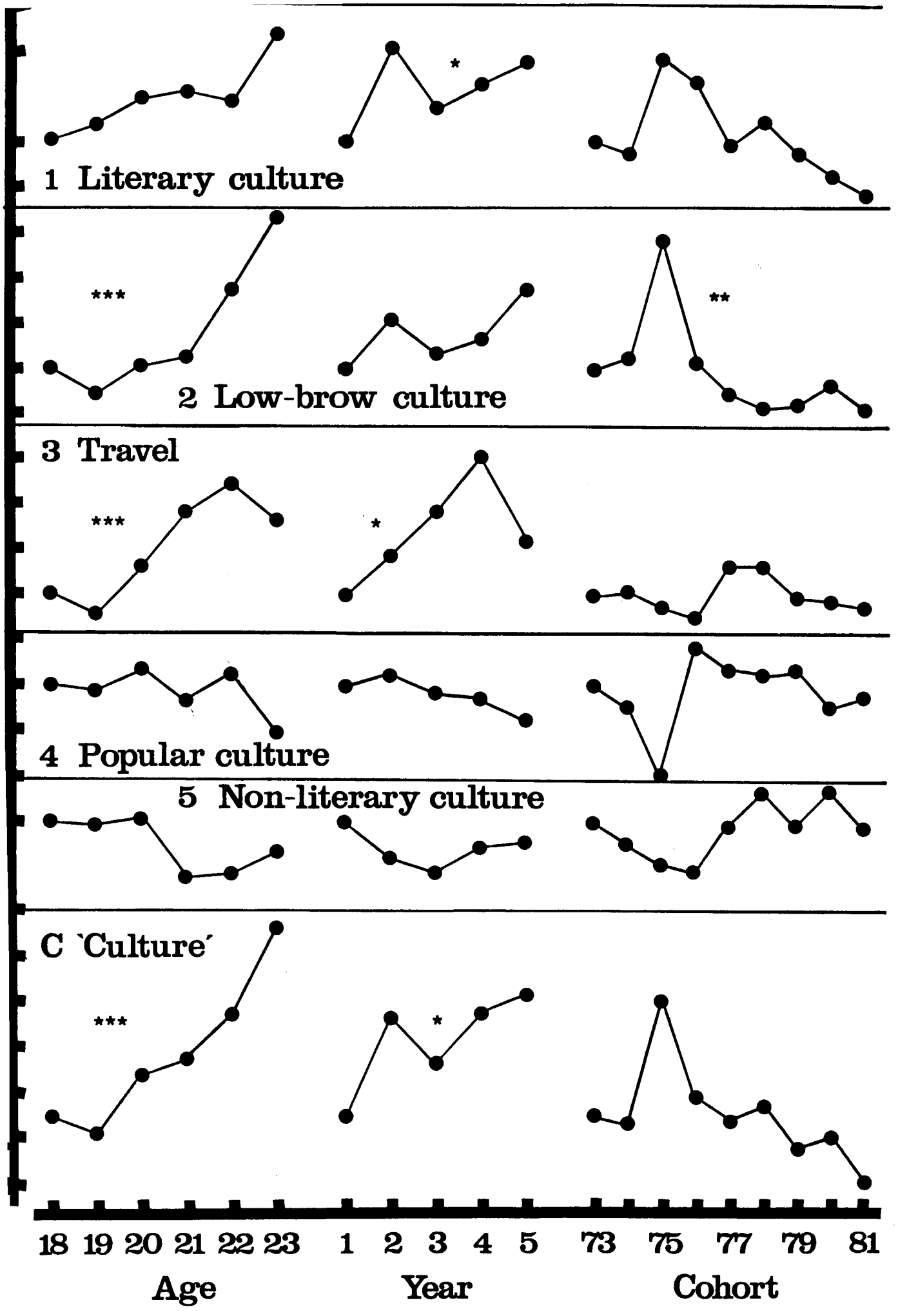
1 Literary culture
*
2 Low-brow culture
***
**
3 Travel
***
*
4 Popular culture
5 Non-literary culture
C 'Culture'
***
*
18 19 20 21 22 23
Age
1 2 3 4 5
Year
73 75 77 79 81
Cohort

Table 11-1: Shows hierarchical multiple regressions of the six culture factors. Descriptions of variables have been modified so that all beta coefficients are positive. N=312.

Order of Entry	Variable	Beta	p
Dependent variable = 1: Literary Culture.		Multiple R = .317	
1	Private sector education	.241	<.001
2	Less medical schools on UCCA form	.141	.010
3	Female applicant	.129	.020
4	Older applicant	.128	.019
Dependent variable = 2: Low-Brow Culture.		Multiple R = .522	
1	Older applicant	.276	<.001
2	Less O-levels taken	.289	<.001
3	Biology A-level not taken	.156	.001
4	More A-levels taken	.107	.032
Dependent variable = 3: Travel.		Multiple R = .358	
1	Higher social class	.253	<.001
2	Mature applicant	.170	.004
3	Oxbridge applicant	.202	.003
4	Higher average A-level grade	.141	.012
Dependent variable = 4: Popular Culture.		Multiple R = .470	
1	Male applicant	.469	<.001
Dependent variable = 5: Non-literary Culture.		Multiple R = .300	
1	Female applicant	.285	<.001
2	Not accepted for any medical school	.109	.045
Dependent variable = C: Overall culture.		Multiple R = .537	
1	Older age	.329	<.001
2	Higher social class	.176	<.001
3	Female applicant	.161	.002
4	Higher proportion of sixth form going to university	.176	.001
5	Less O-levels taken	.164	.001
6	Less medical schools on UCCA form	.137	.012
7	Earlier UCCA application date	.153	.018
8	Not accepted for any medical school	.117	.020

Table 11-2: Shows Pearsonian correlations between the four dimensions of the Eysencks' Personality Questionnaire and the five orthogonal measures of culture and the general 'Culture' factor, C. NS: Not significant; +: $p<0.10$; *: $p<0.05$; **:$p<0.01$; ***:$p<0.001$.

	E		N		P		L	
1: Literary culture	.118	*	.007	NS	.115	NS	-.169	**
2: Low-brow culture	-.071	NS	.066	NS	.063	NS	-.051	NS
3: Travel	.196	***	.012	NS	.037	NS	-.198	***
4: Popular culture	.173	**	-.015	NS	.204	***	-.198	***
5: Non-literary culture	.122	*	-.019	NS	-.136	*	-.014	NS
C: 'Culture'	.134	*	.042	NS	.069	NS	-.199	***