J. biosoc. Sci. (first published online 2003) **36**, 333–349
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DOI: 10.1017/S0021932003006229

COGNITIVE ABILITY AND OCCUPATIONAL STATUS IN A BRITISH COHORT

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Summary. The relation between individual trait differences, social mobility and social structure is central to social biology. Because genetic variance underlies phenotypic variance in some of these traits, for example IQ, several mechanisms determine the population variance. Polygenic inheritance is the basic mechanism. Social mobility and assortative partner choice distribute the trait variance within generations. This feedback circle is constrained by sociological conditions at several levels of analysis. Fundamental to this theory of social assortment is the relation between social–biological traits and social class on the one hand, and these traits and social mobility on the other hand. The focus here is on the relation between social class, social mobility and cognitive ability. The National Child Development Study is drawn upon, including the last follow-up (1999–2000). By approaching this relationship through various methods, both social–biological and sociological aspects of this research question can be assessed.

Introduction

The relation between individual differences in intelligence, educational and occupational attainment is a central research topic in the social biology and sociology of social stratification. Where the sociological approach focuses on the macro-sociological context of intelligence-related social mobility, the biosocial approach encompasses the heritability of intelligence, the degree of non-random social mobility, the relation between social class and intelligence, and the possible dysgenic effects of reproductive differences between social classes (see Retherford & Sewell, 1988, for an excellent comprehensive approach). Taken together, these components construct the theory of social assortment (Thienpont, 2001).

The biosocial relevance of intelligence variance within and between populations is based on the fact that mean values for psychometrically and anthropometrically measured characteristics differ between social classes, albeit with considerable

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variation within each social class (Walter, 1962; Blau & Duncan, 1967; Bajema, 1968; Duncan *et al*., 1972; Mascie-Taylor, 1998).

Social mobility accounts to a large degree for the association between social–biological and sociological differentiation. Upwardly mobile individuals are, on average, more intelligent, of greater body height and of lower body weight and muscular structure compared with those who move down the social hierarchy and, to a lesser extent, compared with the socially sedentary (Cliquet, 1968; Waller, 1971; Gibson & Mascie-Taylor, 1973; Gibson *et al*., 1983). Ultimately, non-random social mobility finds its origin in the genetic variance underlying phenotypic variance. As a consequence of relatively high heritabilities, traits such as cognitive ability and body height are subject to polygenic or multifactorial inheritance. The intergenerational effect of polygenic inheritance is to create new social–biological variation in each generation. Non-random mobility, then, redistributes this biologically created variation between social groups within the population. Among several social–biological traits that are subject to this type of distribution, intelligence or cognitive ability is certainly one of the sociologically and sociobiologically most relevant ones.

However, dynamics of distribution and redistribution do not occur in a sociological vacuum. Macro-sociological conditions shape the constraints on and possibilities for social mobility. Changes in the labour market structure encompass the growth of the manual and non-manual occupations at the expense of the farming sector as well as a continued growth of the non-manual sector and a stagnation and decline of the manual sector. Demographic variables influence the relationship between individual traits and educational and occupational attainment as is the case, for example, for ethnic differences (Davis, 1995). Socio-structural factors, such as the type of school children attend, also mediate the influence of intelligence on educational achievement (Kerckhoff, 1993). Thus, social contexts define the structural limits for the assortative feedback circle between polygenic inheritance and social mobility.

The relation between intelligence differences and social structure is therefore an essentially interdisciplinary research question, which can be subsumed under the biosociological model of social assortment (Thienpont, 2001). The social–biological and sociological literature of stratification each tend to focus on different elements within this framework. In this paper, the focus is on the basic principle of that model: the relation between individual traits and social position.

The research problem

This paper re-addresses the relation between individual differences in intelligence and social class using data from the National Child Development Study (NCDS), the longitudinal follow-up of a British cohort born between 3 and 9 March 1958. In this analysis, the last follow-up (1999–2000) is included. First, intergenerational mobility is looked at, by means of inflow and outflow rates and relative mobility chances. These findings are then complemented with bivariate relationships between intelligence and social class on the one hand, and intelligence and social mobility on the other hand. The relation between intelligence and social position is then further

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Table 1. Selected variables from the NCDS

NCDS code	Variable name in the model	Variable	Percentage missing cases	NCDS follow-up
N236	Scorig	Social class of mother's husband	11·32	1958
N851	FathInt	Father's interest in child's education	46·46	1969
N852	MothInt	Mother's interest in child's education	34·01	1969
N920	TotIQ	Total score on intelligence	23·85	1969
N923	ReadIQ1	Reading comprehension	23·85	1969
N926	MathIQ1	Mathematics test score	23·87	1969
N2396	EducF	Age father figure left full-time education	40·24	1969
N2397	EducM	Age mother figure left full-time education	38·41	1969
N2930	MathIQ2	Test 2 – mathematics comprehension	35·77	1974
N2928	ReadIQ2	Test 1 – reading comprehension	35·41	1974
N4656	Olevels	Number of O levels passed	58·89	1981
N4658	Alevels	Number of A levels passed	85·46	1981
ACTAGEL2	EducAtt	Age when cohort member left full-time education	39·97	1999
SC	SClast	Current social class	48·32	1999
SC2	SC1	Social class of first job	72·33	1999

analysed by means of a structural path model of educational and occupational attainment.

The NCDS is well suited for this problem given the wide range of variables included and the period covered. The last follow-up traces the respondents in a social environment that differs in many respects from the environment they were born into and even from the social and economic conditions that shaped their educational career. According to the industrialization thesis, the direction of change should be one propagating the role of individual level characteristics such as cognitive ability (Esping-Andersen, 1993).

Data preparation

A sample was constructed out of the NCDS. Variables were taken from several follow-ups (Table 1). In the subsequent analysis and model construction, the variable names as indicated in the second column of Table 1 are used.

In dealing with the problem of case attrition, other studies using the NCDS resorted to imputation (Bond & Saunders, 1999). This was not done here for two reasons. First, pairwise deletion of missing values still resulted in a sufficient number of cases for the construction of intergenerational mobility tables. Second, in the construction of structural models a specific procedure was developed to deal with the missing-values problem (see further).

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The central variables of the sample are the various measurements of cognitive ability, parental social status (Registrar General classification), educational attainment and occupational attainment (Registrar General classification). In addition, a number of other relevant background variables are included in order to incorporate at least some of the main co-determinants of educational and occupational attainment.

Methods

The intergenerational mobility table provides the elementary information on the degree and direction of mobility in the present sample. The mobility tables are based on pairwise deletion.

Mobility tables provide a macro-sociological picture but give no substantial insight into the meaning and/or relevance of average group differences in cognitive ability. Path models are more informative in this respect. They reveal covariates of mobility and social class at several levels of analysis. The use of path models for the analysis of educational and occupational attainment is acknowledged in the sociology of social status attainment but heavily criticized by the class analytical approach to social mobility. It is argued here that, by taking into account the findings from the last NCDS follow-up and by developing specific methodological solutions to the problem of missing cases, the structural model developed here is both highly informative and methodologically sound.

The high percentages of missing values in nearly all the variables require a separate missing-data analysis (Schafer, 1997). Moreover, path model parameter estimation is sensitive to missing-data presence (Bollen, 1989). As the probability for missing values is correlated in some variable pairs, and sometimes correlated with the observed values, it is concluded that the missing-data process is not completely at random but probably missing at random. This implies the need for statistical procedures that produce unbiased estimates under such data conditions. Three options are available: imputation, EM estimation of the covariance matrix and FI-ML estimation as available in AMOS. Both Bayesian imputation and FI-ML estimation failed due to data conditions (e.g. only 335 out of 18,560 cases contain no missing data), while EM ML estimation of the covariance matrix converged. This matrix (Table 2) was used as input for the model estimation. From sensitivity analysis, EM is known as a very reliable procedure yielding proper model parameter estimates and standard errors (Verleye *et al*., 1998; Verleye, 1999).

Results

The starting point for any interdisciplinary study on social mobility is the intergenerational mobility table (Table 3). Only 25% of the sample is socially non-mobile; 54% of the sample is upwardly mobile. These relatively high proportions may be explained by the sociological context. The individuals in the NCDS cohort grew up in a time of economic and social progress. The past four decades are characterized by the development in Western societies of more open educational systems and substantial changes in the composition of the labour market. The educational and occupational attainment of the generation that makes up the NCDS therefore takes

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Table 2. Covariance matrix for the variables in the model

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	n	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560	18,560
1	SCorig	1·00														
2	TotIQ	−0·31	1·00													
3	ReadIQ1	−0·33	0·75	1·00												
4	MathIQ1	−0·34	0·81	0·75	1·00											
5	ReadIQ2	−0·33	0·73	0·80	0·71	1·00										
6	MathIQ2	−0·35	0·69	0·65	0·77	0·66	1·00									
7	FathInt	0·33	−0·42	−0·42	−0·43	−0·44	−0·42	1·00								
8	MothInt	0·29	−0·39	−0·39	−0·40	−0·41	−0·38	0·78	1·00							
9	EducF	−0·49	0·28	0·31	0·31	0·28	0·33	−0·29	−0·26	1·00						
10	EducM	−0·38	0·27	0·30	0·29	0·27	0·31	−0·26	−0·25	0·57	1·00					
11	Olevels	−0·37	0·57	0·59	0·63	0·60	0·68	−0·40	−0·38	0·34	0·32	1·00				
12	Alevels	−0·31	0·47	0·53	0·54	0·53	0·61	−0·34	−0·32	0·26	0·26	0·54	1·00			
13	EducAtt	−0·35	0·41	0·45	0·46	0·41	0·53	−0·32	−0·30	0·36	0·34	0·60	0·49	1·00		
14	SC1	0·24	−0·38	−0·40	−0·41	−0·42	−0·43	0·26	0·24	−0·24	−0·22	−0·45	−0·41	−0·40	1·00	
15	SClast	0·26	−0·39	−0·42	−0·42	−0·43	−0·43	0·27	0·25	−0·25	−0·20	−0·43	−0·38	−0·41	0·60	1·00
	SD	1·23	16·27	6·36	10·41	7·09	7·00	0·83	0·79	1·62	1·38	2·98	1·41	2·29	0·88	0·91
	Mean	4·83	42·59	15·84	16·42	25·04	12·44	2·84	2·69	3·89	3·91	3·75	1·30	17·13	2·77	2·87

Table 3. Intergenerational social mobility (absolute numbers)

Social class of origin	Current social class						
	I	II	IIINM	IIIM	IV	V	Total
I	60	229	66	31	29	3	418
II	118	638	233	137	100	15	1241
IIINM	54	401	218	144	80	14	911
IIIM	178	1490	975	1008	571	157	4379
IV	26	295	228	256	174	56	1035
V	18	190	162	191	115	39	715
Total	454	3243	1882	1767	1069	284	$n=8699$

M, manual; NM, non-manual.

place in a macro-sociological context that provides new and more opportunities for social mobility.

However, social inequalities have not disappeared. An insight into the relation between macro-sociological changes profitable to social mobility and persisting social inequalities in terms of mobility is gained by comparing intergenerational mobility tables with relative mobility rates. Relative mobility rates refer to the distribution of mobility chances between different social classes. Calculating relative mobility rates can be done on the basis of either disparity ratios or odds ratios. Disparity ratios express relative mobility rates as the chances of individuals of different classes of origin being found in one particular class of destination. That is, in the calculation of disparity ratios one relates the cell frequency of one class of destination to the corresponding marginal total. Odds ratios compare these chances to those of the same individuals being found in some other destination class (Goldthorpe, 1980; Breen & Goldthorpe, 1999). Odds ratios were also applied as a measure of relative mobility rates because the relative chances compare different class origins with different class destinations, whereas disparity ratios compare relative chances in terms of classes of origin only.

To calculate the relative mobility chances for the present sample, the social classes of origin and destination are re-coded into a three-class version in order to avoid distortion of relative mobility chances due to small cell frequencies. Classes I and II are combined, as are III manual and non-manual and IV and V. Admittedly, the combination of the manual and non-manual workers in one class is subject to discussion. However, to maintain a simple manual/non-manual distinction is a drastic reduction of the overall six-class classification. The three-class scheme allows the maintenance of sufficient information and an ordered albeit rudimentary view on the social class structure. Table 4 gives the cell frequencies of the revised class schemes.

For the calculation of relative mobility chances, Goldthorpe's procedure is followed (Goldthorpe, 1980, pp. 77–78). Table 5 gives relative mobility chances expressed as odds ratios. These can be calculated for each pair of classes of origin in relation to each pair of classes of destination.

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Table 4. Revised social class scheme (absolute numbers)

Social class of origin	Current social class			
	I	II	III	Total
I	1045	467	147	1659
II	2123	2345	822	5290
III	529	837	384	1750
Total	3697	3649	1353	$n = 8699$

Table 5. Relative mobility chances

Classes of origin in competition	Classes of destination competed for		
	I vs II	I vs III	II vs III
I vs II	2·46	2·76	1·12
I vs III	3·56	5·16	1·46
II vs III	1·44	1·87	1·31

In Table 5, the relative mobility rate of 2·46 means that the chances of an individual from a class I background arriving in class I rather than class II, are 2·46 times bigger than for an individual from social class II origin. Comparing individuals from class I and class III backgrounds, it can be seen that the chances of the former arriving in the same class as their father rather than social class III are more than 5 times bigger compared with individuals with a class III background. Relative mobility rates demonstrate that, although Table 3 clearly shows that this cohort is a socially mobile group, distinct inequalities between individuals of different social class background remain.

The next step is to bring individual differences in cognitive ability into the picture. This is first done by relating social class and social mobility to different measures of cognitive ability. Figure 1 confirms the long-standing relation between cognitive ability and social class. This probably concerns one of the main truisms in the social biology of social stratification.

Three explanations have been brought forward to account for this relation (Bielicki & Waliszko, 1992; Strickland & Shetty, 1998). The '*artefact*' explanation attributes observed differences to methodological or technical inadequacies. The '*environmental*' explanation refers to different living conditions between social classes. Among those conditions are economic and social factors including processes of impoverishment but also, for example, levels of stress and the different coping mechanisms, which for example, influence the relationship between unemployment and ill health (Strickland & Shetty, 1998). These circumstances are in close association with specific behavioural or cultural patterns: individual choices, autonomously made,

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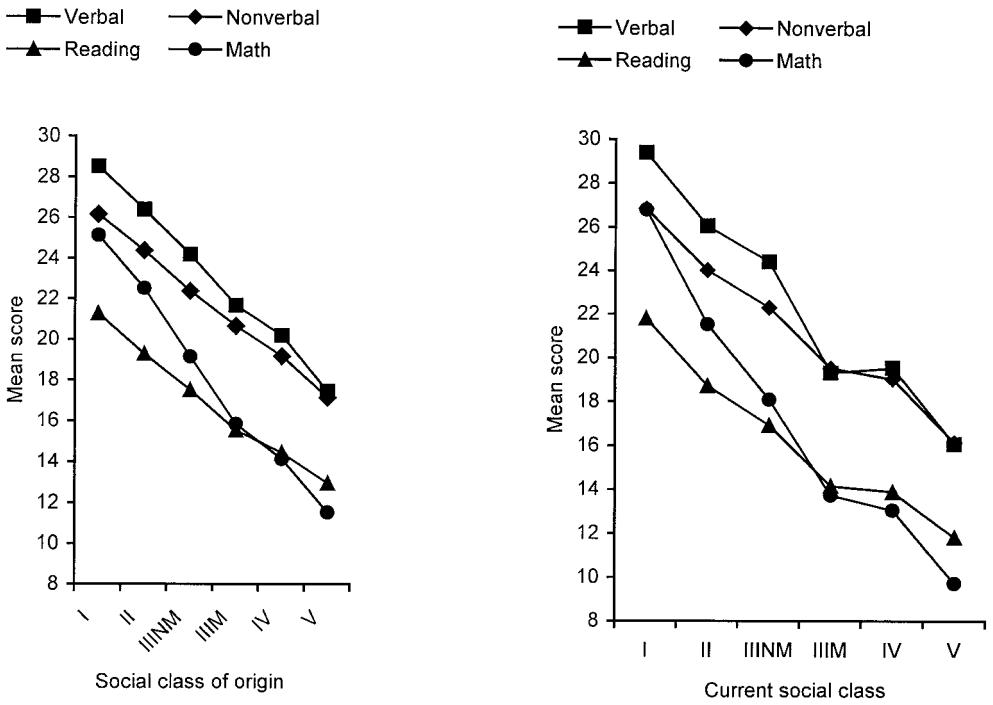


Fig. 1. Cognitive ability and social class of origin (left-hand figure) and current social class (right-hand figure).

that determine patterns of behaviour resulting in onset of disease and associated mortality. The lower social classes do not, for example, seem to possess the same degree of occupational control, direction and planning (Link *et al.*, 1993). With respect to social gradients in intelligence, this has been called the deprivation model (Eckland, 1971) or the social advantage/disadvantage (SAD) thesis (Saunders, 1997). Middle-class children are said to enjoy both material and cultural advantages which markedly enhance their chances of educational and occupational success. A variant on this theory is the 'average child concept' (Jensen, 1969). This is the belief that all children are basically very much alike in their mental development and capabilities, and that their apparent differences in these characteristics as manifested in school are due to rather superficial differences in children's upbringing at home, their pre-school and out-of-school experiences, motivations and interests, and the educational influences of their family background.

The '*trump card*' hypothesis, thirdly, refers to a process of social mobility leading to the concentration of particular variants of a trait in specific socioeconomic groups or social classes. It is in effect an assortative process, making use of available trait variation to reallocate particular trait variants to particular social positions. It has often been referred to as a '*selection* process' operating on social grounds: because a particular trait (good health or high intelligence) offers a social advantage, individuals displaying the trait are, one way or another, 'selected' from their social class of origin

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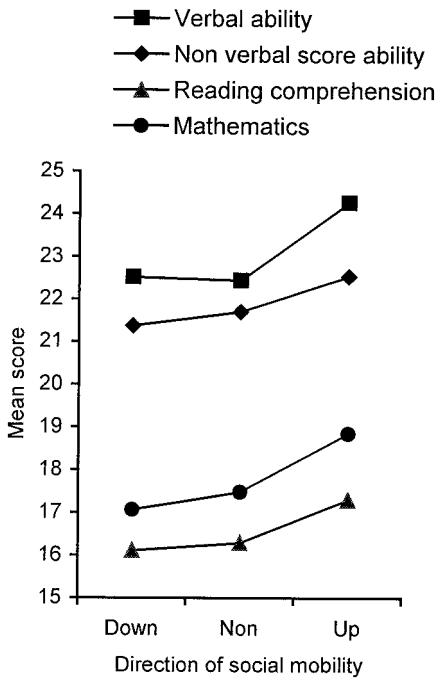


Fig. 2. Direction of social mobility and average score on four measures of cognitive ability.

and moved to another social class where the various status elements are more suited to the trait. For example, with respect to health, the argument is that in achievement-oriented societies, members of socially disadvantaged groups who are healthier or have individual characteristics favourable to good health, rise up the social scale and displace members of the more privileged groups with less favourable characteristics (West, 1988, 1991; Bartley & Plewis, 1997). Social class differences are thus produced as a result of the traits themselves, regardless of differences in environmental conditions. Traits become trump cards in social life.

Or it can work in the opposite direction (Miech *et al.*, 1999; Johnson *et al.*, 1999). The over-representation of mental disorders towards the lower end of the social scale, for example, can partly be accounted for in terms of impaired social mobility. Selective social mobility operates within and between generations. Within generations, mental disorders may cause downward mobility among adults and lead them to drift into the lower social classes. Between generations a disorder may be transmitted to offspring. A transmitted disorder that impairs the process of educational and/or occupational attainment may have cumulative effects across successive generations.

For the purposes of this paper, it is the third explanation that is of prime concern. Figure 2 shows that social mobility in this sample is non-random. Social mobility effectively accounts for social class differences in intelligence.

As stated earlier, the structural path model allows determinants of social mobility to be looked at in a more fundamental way. The model consists of the most

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elementary variables in the explanation of educational and occupational attainment. In this respect, it strongly resembles Bond & Saunders' model (Bond & Saunders, 1999). Two social status variables are included: social class at the time of entry into the labour market and social status at the time of the last follow-up. This enables the extent education sorts individuals to particular jobs to be assessed. Does additional sorting occur after individuals have entered the job market?

Four latent variables were constructed out of the indicators taken from the NCDS. For *intelligence*, the reading and mathematics comprehension tests (taken at ages 11 and 16), and the total intelligence test combining verbal and non-verbal intelligence (taken at age 11) were taken as indicators. *Educational attainment* is operationalized in terms of the number of O and A levels passed and the age when the cohort member had left full-time education. Two latent variables reflect peer influence. The indicators for *educational attainment of the parents* are the age at which the mother and father left full-time education. *Parental interest in the child's education* was operationalized in terms of father's and mother's interest. It reflects an engagement of the parents towards the child's education. The complete structural model is given in Fig. 3. Table 6 gives the standardized total effects of determinants on educational and occupational attainment.

The overall fit of the model is very satisfactory. The GFI, an absolute Goodness of Fit Index, equals 0·942. This value is higher than the desired threshold of 0·9 (Hair *et al.*, 1998, p. 635). The relative amounts of variances and covariances in the data are therefore very well predicted by the model. The adjusted for degrees of freedom index, AGFI, equals 0·909 and is higher than the 0·8 desired value. Comparing the fit of the model with a 'no effect' baseline model again shows a superior model indicated by $\Delta_1 = 0{\cdot}949$ and $\rho_1 = 0{\cdot}929$ (Bollen, 1989, p. 275). All model parameters are significant at the 0·05 level except the regression path from IQ to SC1.

Intelligence exerts by far the strongest influence on educational and occupational attainment. Its influence on occupational attainment goes almost exclusively through education. The path IQ–education–occupation is strong. The explained variance of educational attainment amounts to 75%: of social class 1 this is 31%, of last social class 42%. The direct link between IQ and social class is weak to non-existent.

Educational attainment is explained here largely in terms of IQ differences. Parental education appears to be the strongest peer influence among those selected here but compared with IQ the educational level of the father and mother accounts for little variance in educational attainment of the children.

It is of particular interest to look at social class of the cohort member. Education has a strong impact on social class, but significantly more so on social class at entry into the labour market. It therefore appears that the labour market selection effectively sorts individuals out on the basis of educational credentials, and, due to the tight link between IQ and education, on the basis of individual differences in cognitive ability. The direct effect of education on last social class is less strong but still relevant. When looking at the total effects (Table 6), it transpires that educational degrees continue to be used as important selection criteria. Previous job experience and education are highly relevant determinants of intragenerational mobility.

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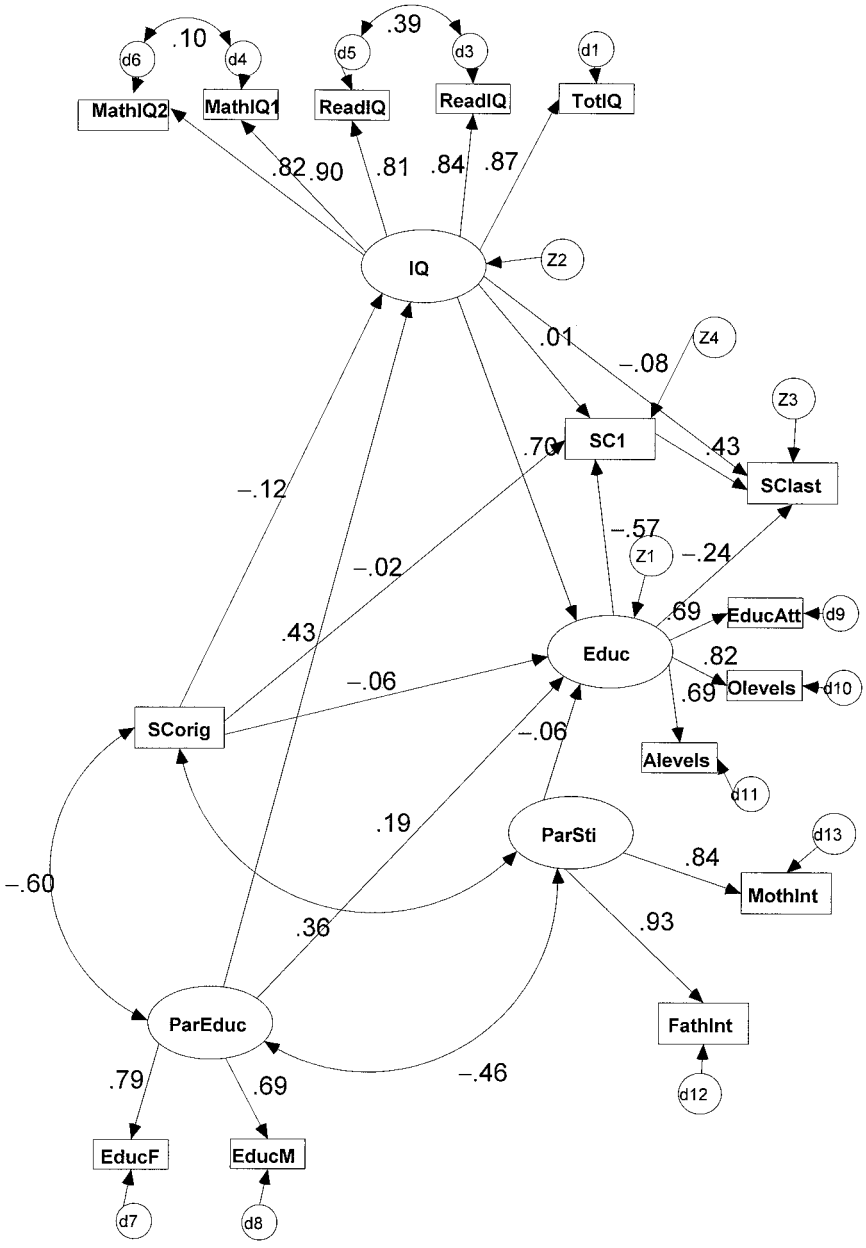


Fig. 3. Structural path model for social status attainment (path coefficients are standardized regression coefficients).

Social class of origin is a variable of non-importance in this model. There is a direct effect of social class of origin on IQ, but the meaning of this effect is open to various interpretations. In terms of total effects, social class of origin has some

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Table 6. Standardized total effects

Dependent variables	Determinants					
	Social class of origin*	Parental interest	Parental education	IQ	Education	First social class
IQ	−0·124		0·431			
Educational attainment	−0·145	−0·065	0·488	0·702		
First social class*	0·066	0·037	−0·274	−0·389	−0·575	
Last social class*	0·072	0·031	−0·268	−0·414	−0·483	0·427

*Negative signs are the consequence of coding of variables. For the social class variables higher codes represent lower social classes.

contribution to educational attainment, but virtually none to the social status of the cohort member. The relative (non-)importance of this variable compared with IQ is not surprising in view of a post-industrial labour market on the one hand, and the long acknowledged relation between individual traits and social status on the other hand. However, the size and magnitude of the effect differences between IQ and social class of origin are enormous. This might be due to a more detailed and realistic operationalization of IQ than of social class of origin. Instead of taking the social status allocated to the husband of the child's mother at the time of birth, using several indicators of social status such as ownership and size of the house, savings, and so on, might have yielded more moderated differences between social class of origin and IQ. On the other hand, parental education as an explaining variable did not do much better than social class of origin. A more detailed operationalization of social class of origin will therefore very likely moderate the effect of IQ and enhance that of social class of origin, but the authors are not inclined to hypothesize that it would change the general results of this model in any substantial manner.

Discussion

The increasing relevance of individual knowledge for the professional career has been emphasized repeatedly as an essential feature of post-industrial social organization (Bell, 1973; Crook *et al.*, 1992; Esping-Andersen, 1993). Although by no means complete, a transition from ascription to achievement towards the later stages of industrialization has indeed been realized, mainly as a consequence of educational policies aimed at equalizing opportunities (Jonsson & Mills, 1993). Therefore, although social constraints still create differential life chances in educational and occupational careers (Goldthorpe, 1992, 1996), conceptually and analytically, individual achievement rather than ascription of social and socioeconomic status is an undeniable aspect of the logic behind knowledge-based societies (Jonsson & Mills, 1993; Saunders, 1997; Bond & Saunders, 1999). This would in turn contribute to the process of social assortment, described in the social biology of stratification. Between-group differences in average values for individual traits that are related

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to educational and occupational attainment will increase in (post-)modern societies.

These elements are usually treated separately, with the sociology of social mobility preferably devoting attention to the socio-structural constraints and possibilities for social mobility. As early as the 1930s and 1940s, biosocial studies were primarily interested in the relation between individual traits and social mobility and social class. In this paper, these elements have been brought together. Intergenerational mobility tables showed considerable mobility rates, but the relative mobility rates indicate an unequal distribution of the chances for mobility between individuals coming from different social origins. A structural path model, finally, explains part of the findings in previous tables. There is a moderate relation between social class and intelligence, which is in line with the average differences in IQ between individuals originating from different social classes. This relation, however, is small and therefore within-class variation in IQ must be the rule. This variation is then 'exploited' by educational and occupational recruitment: a very strong relation exists between IQ and educational attainment, and a strong effect is exerted by educational attainment on occupational attainment. The structural model thus complements the mobility tables: it explains what the paths to occupational status mobility are and what the mechanism is behind the macro-sociological trends observed in mobility tables.

The authors do not wish to indulge in a sociological discussion on the nature of social class and how it ought to be operationalized. True, other operationalizations of social status than the one used here may well yield different parameter estimates and the NCDS data include various social class scales. The authors strongly doubt, however, that the general trend identified by this structural model would change drastically by employing another social class measure.

At the beginning of the paper, the broader theoretical framework within which the determinants of social mobility should be studied were also alluded to. It was possible in this paper to touch upon one of the most basic elements of that framework. Analytically, the estimation of the heritability of cognitive ability for this cohort and the role of homogamous mate choice were left out. Indeed, in addition to social mobility, assortative mate choice also distributes variance in social–biological traits. The major influence of assortative mate choice is intergenerational, to the extent that it is followed by assortative mating and may then lead towards reproductive differentials between socioeconomic groups. A feedback circle can thus be identified whereby polygenic inheritance, social mobility and assortative mate choice are in constant interaction. Polygenic inheritance creates in each generation a new amount of variance in cognitive ability, along the lines of the statistical effect of regression to the mean.

Social mobility re-allocates variants in the IQ distribution within the social structure of society. This leads to assortment of IQ variants in social classes. Assortative mate choice amplifies the assortative effect of social mobility. When followed by assortative mating, there is an increasing likelihood that children will resemble their parents in terms of social–biological traits, although there is discussion on the degree of assortative mating that is required to obtain this genetic effect (Lewontin *et al.*, 1968).

As for genetics, suffice it here to emphasize that genetic variance is necessary to explain between-class differences in intelligence, because environmental differences

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alone cannot offset the distributive effects of the polygenic inheritance mechanism. If they could, it would imply that the range of individual differences within phenotypic classes is narrowed down to the mean of each social class. In other words, the between-family component and the genotype × environment interactive term in the phenotypic variance equation should predominate.

This, however, is not what behaviour genetics studies have come up with. Analyses on the data in the Texas Adoption Study suggest that additive gene effects account for about 38% of the true score variance in IQ, that shared family environment accounted for 19%, and that genotype × environment correlation accounted for about 10%. Environment not shared by family members, non-additive genetic effects, and gene–environment interaction was thought to represent the remaining 33% (Loehlin, 1979; Horn *et al*., 1982). Further, one of the major recent discoveries of behaviour genetics is that variables such as socioeconomic status, cultural background, parents' education and occupation, style of child rearing, number of books in the home, and the like, account for little or none of the variation in the IQs of adolescents and adults, although these shared environmental factors account for about half of the total environmental variance in preadolescent children (Jensen, 1997; Loehlin *et al*., 1997). Adoption studies on adolescents and young adults show that the effect of shared environment diminishes to almost zero, with little change in the proportion of non-shared (or within-families) environmental variance and a marked increase in the proportion of genetic variance. Yet the adoptive families in these studies differ widely in socioeconomic status and other variables on which many families typically differ from one another. In other words, most of the non-genetic variance in intelligence is variance existing *within* families, comprising those environmental effects that are unshared or specific to each child in the family. Thus, with increasing maturity the individual's genotype is increasingly expressed in the individual's phenotypic characteristics, reflected by the diminishing proportion of environmental variance and the increasing proportion of genetic variance (Jensen, 1997).

Although theoretically essential, all these elements are too far out of the scope of this paper. Here, an analytical picture of the elements of educational and occupational attainment are provided. This was done on the basis of a structural path model complementing mobility tables. In the NCDS cohort, intelligence predominantly influences educational attainment, which in turn affects occupational attainment to a very large extent. Explained variances of the dependent variables are all relatively high. In that sense, this paper confirms the basic statistical relation for the theory of social assortment and demonstrates that social mobility remains a prime sociological dynamic force in the biosocial partitioning that characterizes modern societies.

Acknowledgments

The authors thank the UK Data Archive at the University of Essex for supplying the data from the National Child Development Survey. The analysis performed on the data and the theory built around it is the sole responsibility of the authors. They also thank Professor C. G. N. Mascie-Taylor and Professor Robert Cliquet for their comments on earlier versions of this paper, and the reviewers for their comments.

https://doi.org/10.1017/S0021932003006229 Published online by Cambridge University Press

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