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Parenting practices and intergenerational associations in cognitive ability

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Background Cognitive ability is an important contributor to life chances, with implications for cycles of advantage or disadvantage across generations. Parenting practices are known to influence offspring cognitive development, but the extent to which these mediate intergenerational continuities and discontinuities in cognitive ability has not been adequately studied.

Methods We used factor analysis to derive summary measures of parenting practices, and regression analyses and path modelling to test associations between these and cognitive function at age 8 years in 1690 first offspring of the British 1946 birth cohort. Analyses allowed for direct and indirect effects of parental original and achieved social circumstances, educational attainment and own childhood cognitive ability. Additional covariates were provided by indicators of parental physical and mental health.

Results Regression analyses revealed that three aspects of parenting, intellectual home environment, parental aspiration and cognitive stimulation, were positively and independently associated with offspring childhood cognitive ability, whereas coercive discipline was negatively and independently associated. Path modelling was appropriate for intellectual environment, which also revealed direct and indirect effects of parental cognitive ability and educational and occupational attainment on offspring cognitive ability.

Conclusion Parenting practices, particularly provision of an intellectual environment, were directly associated with offspring cognitive development. These data add to the relatively few studies that examine intergenerational continuity and discontinuity in cognitive ability.

Keywords Parenting, cognition, intergenerational, birth cohort

Introduction

There is modest yet consistent evidence that a wide range of parenting practices are associated with offspring cognitive development. Cohort studies indicate that harsh discipline may hinder it,[1] whereas parental interest in education,[2] parenting quality,[3] maternal affection,[4,5] nurturance[6] and cognitively stimulating environments[4,5,7,8] benefit it. Children thus benefited are also more likely, as parents themselves, to be encouraging of their own children's education.[5] Thus parenting practices may play an important role in the

transmission of cognitive skills from one generation to the next. Yet few studies are able to test whether parenting practices mediate intergenerational associations in cognitive ability.

The MRC National Survey of Health and Development (NSHD), the British 1946 birth cohort study, provides prospective measures of social class origin and attainment, childhood cognitive ability and educational attainment, and parenting practices and has measured cognitive ability in their first offspring. We hypothesized that parenting practices would mediate intergenerational associations in cognitive ability.

Methods

Sample

Primary cohort: G1

The NSHD (G1) initially consisted of 5362 children, all births to non-manual and agricultural workers plus a random sample of manual workers selected from all single births within marriage that occurred in England, Wales and Scotland during one week in March 1946. The cohort has been followed up 21 times since birth, most recently at age 53 years when the sample was 3035. At this age the cohort was shown to be representative, in most respects, of the UK population born in the immediate post-war era. Exceptions were an over-representation among non-responders of those never married, those of lowest literacy, those always in a manual occupational social class, and those with psychiatric disorder.[9]

Offspring cohort: G2

The second generation (G2) included 1690 offspring who were born to male and female members of the parent cohort between 1965 and 1975, at ages 19 to 29 years.[5] Three percent of G1 were teenagers at the birth of their first offspring, but by age 30 years 83% of G1 men and 92% of G1 women had at least one child. At G2 ages 4 and 8 years, mothers, or wives of fathers, were given semi-structured interviews by trained health visitors during home visits. Response rates for the G2 survey were high, ranging from 94% at the onset of the study to 100% when G1 parents were aged 27 years. Parents of this second generation were more likely to be of non-manual social class origin ($P < 0.001$) and more highly educated ($P < 0.001$) than cohort members who did not become parents by age 29, or who were lost to follow-up ($n = 3672$). However, there were no differences at the 5% level between the two groups on cognitive ability at ages 8, 11, 15 and 26 years.

Variables

Cognitive ability

Cognitive ability tests were taken in schools at age 8 years by G1 parents and G2 offspring. Three identical tests were used for both generations: (1) word reading (ability to read and pronounce 35 words); (2) sentence completion (ability to complete 35 sentences with an appropriate word); and (3) vocabulary (ability to explain the meaning of 50 words). Each test was made generation-fair for G2 by replacing outdated words such as 'muslin' with words of comparable difficulty.[5] For each generation, scores from these tests were standardized to a mean of 0 and a standard deviation of 1, summed to create a total score representing overall cognitive ability at 8 years, then re-standardized. Cognitive ability scores in G1 and G2 were normally distributed and were available for 91% (1545/1690) of G1 parents and 80% (1351/1690) of G2 offspring.

G1 Parenting

Mothers were asked a range of questions devised for the study related to parenting (Table 1). Factor analysis with promax rotation was employed to maximize this information while reducing the number of outcome variables at both ages. Since the questionnaire items were predominantly dichotomous, a tetrachoric correlation was applied. Individual items were retained if they had a loading near or over 0.35 and the number of factors was based upon those with eigenvalues greater than one.[10] A two-factor solution was the clearest at both ages and accounted for over 95% of the total variance in the observed variables (Table 2). These factors were:

Age 4 years

1. Cognitive stimulation (data available for 94% of parent–offspring pairs) representing measures by parents to stimulate or teach their children, prior to starting formal education.
2. Coercive discipline (94% available) representing parental use of threats and coercion to achieve desired behaviour.

Age 8 years

3. Intellectual environment (80% available) representing the reading culture in the homes.
4. Coercive discipline (79% available) representing parental use of threats and coercion to achieve desirable behaviour, as well as the frequency of inconsistent discipline.

Since the extracted factor scores were continuous measures but were extremely skewed, 5-point scores were calculated for each of the four extracted factors to produce a minimum score of 0 (parents did not answer 'yes' to any of the questions making up that factor) and a maximum score of 4 (parents answered 'yes' to all of the questions making up that factor). For the coercive discipline factor, a maximum score of 9 could be assigned but since only 30 parents applied all or most of the discipline practices making up this measure, those with scores of 5 to 9 were

Table 1 Questions relating to G1 parenting practices. Responses were binary (Yes/No) unless otherwise stated

Question	Age 4 years	Age 8 years
Have you (or your husband) taught X the alphabet?	■	
Have you (or your husband) taught X to count?	■	
Have you (or your husband) taught X to write?	■	
Have you (or your husband) taught X his/her colours?	■	
Have you tried to prepare X in any way for going to school?	■	
Does your husband read or tell stories to X?	■	
Do you read or tell stories to X?	■	
Do you regularly take out books from the library?		■
Does your husband regularly take out books from the library?		■
Do you or your husband read for pleasure?		■
Does X use a lending library of any sort at all?	■	
Does X regularly take out books from the public library?		■
Does X regularly take out books from the school library?		■
Does X read for pleasure?		■
When X has been naughty do you ever send X out of the room or up to bed?	■	■
When X has been naughty do you ever keep X indoors or make X sit still?	■	■
When X has been naughty do you ever smack X?	■	■
When X has been naughty do you ever stop X sweets or not allow X to do something he/she enjoys?	■	■
When X has been naughty do you ever tell X you won't love them if he/she behaves like that?	■	■
When X has been naughty do you ever say that you will send him/her away or that you'll have to go away?	■	■
When X has been naughty do you ever try to frighten X with something like a policeman?	■	■
When X has been naughty do you ever threaten to use a stick or something like that?	■	■
Do you and your husband generally agree about dealing with X when he/she is naughty?[a]	■	■
On the whole, do you feel that where discipline is concerned that you are consistent?[b]		
If X has been especially good during the day, do you generally like to let X know?	■	
If you want X to be good on a particular occasion do you ever promise him/her anything in advance?	■	
Do you or your husband show affection towards X or are you fairly reserved?	■	■
Have you met X's class teacher or head teacher during the past year?[c]		■
Do you ever discuss X's progress with the class teacher or head teacher?[c]		■
At what age would you like X to leave school?[d]		

[a]Item dichotomized to 'usually agree' vs. 'rarely agree' and 'never agree'; [b]Item dichotomised to 'absolutely consistent' and 'fairly consistent' vs. 'not very consistent'; [c]Responses: Yes; with class teacher; with head teacher; with both; [d]Responses: 15 years; 16 years; 17 years; 18 years or later.

re-categorized to form a score with a maximum of 4. Factor residuals were normally distributed.

Three other variables that did not load strongly onto any of the factors were also included:

(1) Parental interest in school activities of G2 at age 8 years (data available for 82% of parent-offspring pairs), based on teacher-parent contacts and teacher-parent communication, ranging from 0 (no interest) to 4 (frequent parent-teacher contacts).

(2) Aspiration, based upon wishes that the child should progress to some form of further education (82% available), ranging from 0 (no aspiration); 1 (leave at age 15 years); (2–3) leave school at age 16–17 years and 4 (hopes for the child to stay on until 18 years or later).

(3) Affection towards offspring (100% available), based on mothers' reports of affection shown towards G2 by either the mother or father at ages 4 and 8 years (yes/no).

Table 2 Factor loadings, eigenvalues and cumulative variance for factor pattern of G1 parenting practices at ages 4 and 8 years

G1 Parenting practices	Factor 1	Factor 2
Age four years ($n = 1523$)		
Cognitive stimulation		
Parents taught child to count	0.95	0.09
Parents taught child to write	0.51	0.02
Parents taught child the alphabet	0.66	0.05
Parents taught child his/her colours	0.76	0.15
Coercive discipline		
Parents told child they wouldn't love him/her	0.09	0.68
Parents disagreed about discipline practices	0.01	0.37
Parents threatened to call a policeman	0.12	0.67
Parents threatened to use a stick	0.10	0.52
Eigenvalues	2.25	1.32
Cumulative variance	0.62	0.98
Age eight years ($n = 1666$)		
Intellectual environment		
Parents regularly took books out of the library	0.96	0.02
Parents read for pleasure	0.88	0.06
Child regularly took books out of the library	0.64	0.07
Coercive discipline		
Parents told child they wouldn't love him/her	0.04	0.58
Parents disagreed about discipline practices	0.07	0.56
Parents used discipline inconsistently	0.13	0.68
Parents threatened to call a policeman	0.03	0.69
Parents threatened to use a stick	0.07	0.43
Eigenvalues	2.58	1.28
Cumulative variance	0.69	0.96

Covariates

Social circumstances can influence cognitive development as well as parenting practices. This was measured by the Registrar General occupational social class of the fathers of G1 parents (i.e. G0),[11] coded into professional, managerial and technical, skilled non-manual, skilled manual, semi-skilled manual and unskilled. Social class of origin was taken from mid-childhood (11 years) of G1 wherever possible, or at age 4 or 15 years if this was unknown. Adult social class was assigned according to the occupational status of the 'head of household' when G1 were aged 26 years.

Educational attainment may part-mediate any association between childhood cognitive ability and subsequent parenting practices. For G1 parents, the highest educational or training qualifications achieved by age 26 years were classified by the Burnham scale[12] and recoded into none; vocational only; ordinary level ('O' levels or equivalent); advanced ('A' levels or equivalent); or higher qualifications (degree or equivalent).

Regression analyses were adjusted for gender, in view of evidence that offspring cognitive development is differentially influenced by maternal education and paternal socio-economic position.[13]

G1 physical and mental health variables were included as possible confounders of the relationship between cognitive ability and parenting practices. These included: psychiatric disorder (duration and severity between ages 15 and 32 years, coded into none (59%, no evidence of psychiatric disorders), mild (37%, minor or inconsequential nervous disorders) or severe (5%, psychiatric episodes of more than a year's duration, or any out-patient or in-patient episodes for psychiatric disorder); neuroticism and extraversion (measured at age 26 years by the Maudsley Personality Inventory[14]); chronic illness (physical,

non-fatal conditions in 14% of parents between ages 20–25 years); physical activity (frequency and duration in the preceding month collected at age 36 years.

G2 characteristics were included in case these affected the parenting practices of their G1 parents. These included gender, and mothers' reports on whether or not G2 offspring were: highly strung (age 4 years); had frequent temper tantrums (age 4 years); got angry with parents (age 8 years); or tried to smack or hurt their mother (ages 4 and 8 years).

Statistical analysis

Regression analysis

Linear regression was used as an initial test of associations between (1) G1 cognitive ability and G1 parenting practices; (2) G1 parenting behaviours and G2 cognitive ability; and (3) the extent to which any association between parental and offspring cognitive ability was explained by parenting practices. For the latter analysis, raw associations (model 1) were adjusted for G1 parenting practices (model 2), and then for the potential confounding effects of G1 education; social class; physical and mental health, and G2 characteristics (model 3). A total of 983 parent–offspring pairs (440 G1 fathers; 543 G1 mothers; 874 G2 boys; 816 G2 girls) with complete data on cognitive ability, parenting practices and all covariates were included in these analyses.

Path model analysis

Path model analysis was used to examine multiple pathways through which cognitive ability might be transferred between generations. Analyses were carried out using AMOS version 4.01,[15] which allows estimation based on incomplete data using full information maximum likelihood estimation (FIML). FIML is preferable to estimation based on complete data (listwise deletion), as FIML estimates will show less bias and be more reliable even when data deviate from missing at random and are nonignorable.[15] Model fit was assessed using the root mean square error of approximation (RMSEA) and comparative fit index (CFI). An RMSEA value close to 0 and a CFI value close to 1 indicate a good fit.[16,17] Educational attainment, social class and parenting practices were included as categorical variables with no fewer than five categories.[18,19]

Results

Regression analysis

G1 cognitive ability was associated with a greater likelihood of engaging in cognitive stimulation of their children (tasks such as teaching counting); with fostering an intellectual environment; with greater affection, interest in G2 schooling and aspiration for their future; and with lower coercion in response to misbehaviour (Table 3). Similar trends for that of G1 cognition were observed for G1 education and occupation. Cognitively stimulating tasks, an intellectual home environment and aspiration were positively associated with offspring cognitive ability (Table 4). Conversely, coercive discipline was negatively associated with offspring ability. G1 parental interest and affection showed no association with G2 cognition and were therefore excluded from subsequent analyses.

Table 5 shows that cognitive stimulation, the provision of an intellectual environment, parental aspiration and the use of coercive discipline at offspring age 4 years were independently associated with offspring ability in the expected directions, after G1 cognitive ability was adjusted. These parenting practices reduced the association between parental and offspring cognitive ability by one-third, thereby suggesting their role in the intergenerational transmission of cognitive ability. Furthermore, the cross-generational effects of parenting, although somewhat attenuated, continued to explain unique variances in offspring cognitive ability after the covariates were accounted for (model 3). G1 mental and physical health and offspring characteristics were not associated with offspring cognitive ability in adjusted models.

Path model analysis

The path model satisfactorily fitted the data for the G1 parenting measure of intellectual environment, parental aspiration and coercive discipline at child age 8 years among fathers (chi-square = 7.0; RMSE = 0.04 [0.00; 0.08]; CFI = 0.99). Goodness of fit values were not satisfactory for cognitive stimulation, parental aspiration and coercive discipline, and path models for these are therefore not presented.

Figure 1 shows the path model for intellectual environment. Consistent with the regression analyses, G1 cognitive ability was positively and independently associated with G2 cognitive ability ($\beta = 0.24$, $P < 0.001$). In addition, quality of intellectual environment provided by G1 was positively and independently associated with G2 cognitive ability approximately equal magnitude ($\beta = 0.20$, $P < 0.001$).

Comparisons of the outputs from an incomplete data model with the outputs from a complete data sample showed that FIML estimations yielded very similar path coefficients as well as chi-square and fit measures despite substantial data loss in the incomplete model.

Discussion

This study identified the importance of parenting in the transmission of cognitive skills from parents to offspring. Specifically, we found benefits of the intellectual environment, cognitive stimulation and parental aspiration and costs of coercive discipline. These effects were independent of parental cognitive ability, education, social class and a range of physical and mental health indicators. Paternal education had an

Table 3 Standardised beta (β) coefficients from the regression of G1 parenting practices on G1 parental cognitive ability, education and social class

	Parenting practice	
	β (95% CI)	*P*-value
G1 Cognitive ability		
Cognitive stimulation	0.11 (0.04 to 0.16)	<0.001
Intellectual environment	0.25 (0.18 to 0.30)	<0.001
Affection (age 4 years)	0.09 (0.03 to 0.16)	0.003
Affection (age 8 years)	0.06 (0.01 to 0.13)	0.05
Parental interest	0.13 (0.07 to 0.20)	<0.001
Aspiration	0.14 (0.09 to 0.21)	<0.001
Coercive discipline (age 4 years)	−0.24 (−0.28 to −0.16)	<0.001
Coercive discipline (age 8 years)	−0.22 (−0.28 to −0.15)	<0.001
G1 Education		
Cognitive stimulation	0.15 (0.06 to 0.18)	<0.000
Intellectual environment	0.30 (0.24 to 0.36)	<0.001
Affection (age 4 years)	0.03 (0.01 to 0.11)	0.05
Affection (age 8 years)	0.04 (0.00 to 0.10)	0.04
Parental interest	0.13 (0.07 to 0.20)	<0.001
Aspiration	0.17 (0.14 to 0.31)	<0.001
Coercive discipline (age 4 years)	−0.27 (−0.32 to −0.20)	<0.001
Coercive discipline (age 8 years)	−0.23 (−0.30 to −0.18)	<0.001
G1 Social class		
Cognitive stimulation	0.08 (0.02 to 0.15)	0.02
Intellectual environment	0.24 (0.16 to 0.31)	<0.001
Affection (age 4 years)	0.14 (0.05 to 0.23)	<0.001
Affection (age 8 years)	0.10 (0.01 to 0.18)	0.03
Parental interest	0.11 (0.07 to 0.20)	0.004
Aspiration	0.13 (0.08 to 0.21)	<0.001
Coercive discipline (age 4 years)	−0.25 (−0.31 to −0.19)	<0.001
Coercive discipline (age 8 years)	−0.25 (−0.31 to −0.18)	<0.001

Table 4 Standardised beta (β) coefficients from the regression of G1 parenting practices on G2 offspring cognitive ability z-scores by parenting behaviour

	G2 Cognitive ability	
	β (95% CI)	*P*-value
G1 Parenting practices		
Cognitive stimulation	0.14 (0.09 to 0.21)	0.001
Intellectual environment	0.33 (0.28 to 0.40)	<0.001
Affection (age 4 years)	0.03 (−0.02 to 0.11)	0.5
Affection (age 8 years)	0.05 (−0.01 to 0.11)	0.1
Parental interest	0.04 (0.01 to 0.12)	0.2
Aspiration	0.16 (0.10 to 0.22)	<0.001
Coercive discipline (age 4 years)	−0.23 (−0.30 to −0.18)	<0.001
Coercive discipline (age 8 years)	−0.18 (−0.24 to −0.12)	<0.001

Table 5 Standardised beta (β) coefficients from the regression of G1 parental cognitive ability z-scores on G2 offspring cognitive ability z-scores

	Model 1 G1 Cognitive ability		Model 2 + Parenting measures		Model 3 + Control variables	
	β (95% CI)	*P*-value	β (95% CI)	*P*-value	β (95% CI)	*P*-value
G1 Cognitive ability	0.36 (0.30 to 0.42)	<0.001	0.25 (0.19 to 0.31)	<0.001	0.18 (0.11 to 0.22)	<0.001
G1 Parenting measures						
Cognitive stimulation			0.09 (0.04 to 0.15)	0.001	0.09 (0.03 to 0.17)	0.005
Intellectual environment			0.23 (0.17 to 0.29)	<0.001	0.18 (0.11 to 0.27)	<0.001
Aspiration			0.09 (0.02 to 0.13)	0.01	0.05 (0.03 to 0.08)	0.03
Coercive discipline (age 4 years)			−0.11 (−0.17 to −0.05)	<0.001	−0.08 (−0.14 to −0.01)	0.01
Coercive discipline (age 8 years)			−0.10 (−0.19 to 0.00)	0.1	−0.09 (−0.11 to 0.01)	0.2
Control variables						
G0 Social class					0.05 (0.00 to 0.09)	0.1
G1 Social class					0.15 (0.09 to 0.21)	0.001
G1 Education					0.10 (0.07 to 0.19)	0.04
G1 Sex					0.12 (0.01 to 0.22)	0.05
LRT: Model 1 vs. Model 2			113.78	<0.001		
R^2	0.12	<0.001	0.24	<0.001	0.28	<0.001
R^2 change			0.09	<0.001	0.05	<0.001

Each model was adjusted for variables in preceding model.

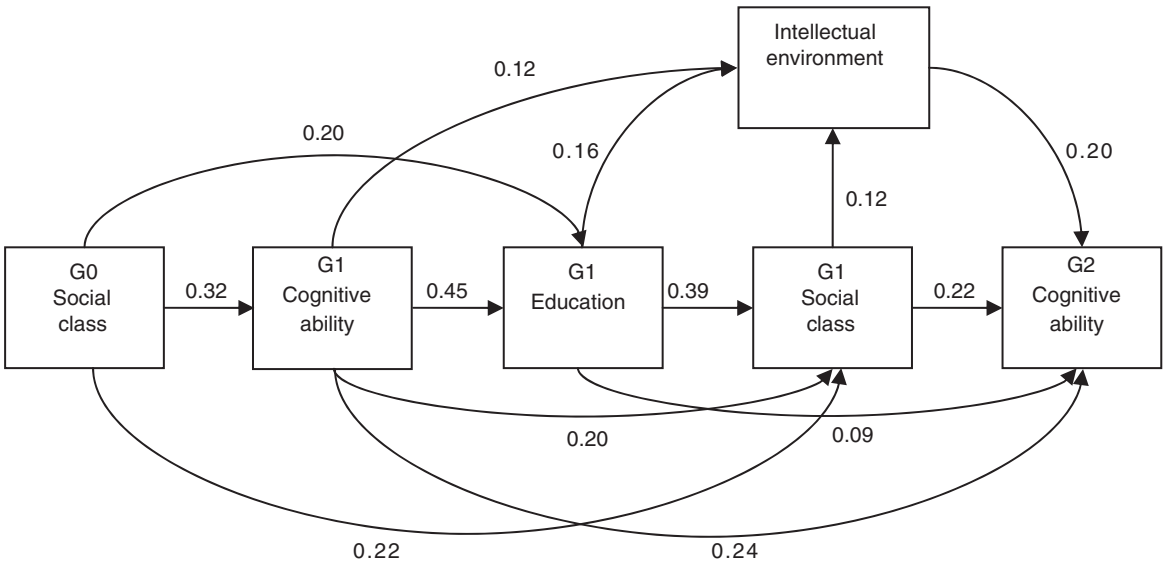

Figure 1 Path diagram representing intergenerational associations in cognitive ability between G1 parents and G2 offspring mediated by the intellectual environment provided by G1 parents. The numerical values refer to standardized beta estimates. All paths are different from zero at the 5% level

indirect effect on offspring cognitive ability through its association with parenting practices. Furthermore, intergenerational effects spanning more than two generations were identified, with G0 social background influencing the cognitive development of G2 offspring via several pathways containing G1 education and occupation.

Given the diverse range of studies on parenting and cognitive ability, all of which employ their own definitions of parenting, it is difficult to make direct comparisons with existing evidence. Nevertheless, these findings support previous studies showing that cognitively stimulating activities such as museum visits, the presence of books and magazines,[4] and

parents' own reading habits[5,20,21] to be important factors in the promotion of cognitive development.

Several study limitations should be noted. First, parents of this second generation cohort were of higher social class origin and were more highly educated than the minority of survey members who had not had children within the study interval, or were lost to follow-up. However, we have no reason to suspect that this would have altered the pattern of results observed. Second, parenting measures relied solely on self-reports and were thus vulnerable to reporter bias.[22] Single-informant reports can also lead to misclassification bias as a result of the particular respondent's personality or experience. Third, effects of parenting style may be culture-specific, and, even within-culture may vary over time, thus limiting the generalizability of findings derived from a cohort that is entirely of White European ancestry. Fourth, although we were able to adjust analyses for certain behavioural and temperament characteristics of the child, these adjustments may not fully rule out the possibility that parenting style was as much of an effect of these characteristics as an influence on them,[23,24] especially since these offspring characteristics were rated by the mother herself rather than an independent observer. Finally, the measures of cognition include only verbal abilities, but since verbal and non-verbal abilities are highly correlated, this is not considered to be a major limitation.

Against these limitations our study also has several strengths. First, these analyses made use of population-based multigenerational, prospective longitudinal data. Second, response rates for the second generation study were high, and the study window was sufficiently wide to capture most first-born offspring. Third, although we should acknowledge that the association between birth order and cognitive development is unclear,[25] all offspring were first-born, thus eliminating any possibility of serial position as a confounder. Fourth, a wide range of grandparental, parental and offspring characteristics enabled the reduction of potential confounding from several other sources; although the design of NSHD did not permit investigation of the possibility that parenting style and offspring cognitive development may be linked by common genetic cause, as shown in the study of adopted and biological siblings.[26] This caveat also applies to the role of education, where there is also evidence of shared genetic influence with cognitive development[27] in addition to educational effects that are more likely to be specifically environmental.[28]

Parents who generated an intellectual environment through their own reading habits and encouraging their offspring to read might have encouraged similar behaviours in children and taught them important non-cognitive skills, such as motivation and perseverance. Children who read regularly may, as a result, be more inquisitive (although being inquisitive almost certainly increases the likelihood of reading), and this may increase the number of parent–child interactions that promote intellectual development. Parental expectation can influence socialization behaviours and parent–child interaction patterns,[29] and it may be that parents engaged and supported their children in solving problems as a means of realizing their aspiration in relation to the future success of their offspring.

Conversely, coercive discipline, the effect of which was observed in fathers, could have reduced opportunities for learning by discouraging the child to persist in problem solving, and limiting the frequency and quality of positive parent–child interactions. Furthermore, coercive parent–child interactions may teach children negative interpersonal styles of behaviour that interfere with academic performance and peer relationships.[30] The stress associated with coerciveness may also impair the regulation of the hypothalamic–pituitary–adrenal axis thereby affecting the biological pathways involved in cognitive development.[31]

The education of fathers did not directly affect offspring ability. However, path models showed that paternal education had an important indirect effect on offspring ability via occupational status as well as parenting skills. It may be that the intellectual home environment was influenced by the resources available for parents to interact with, and invest in, their children. Thus certain parental resources could have been 'purchased' with income—for example, books, newspapers and family outings.

In conclusion, these findings add to a growing body of evidence suggesting that environments which do not facilitate cognitive development at a young age place children at an early disadvantage. Although these findings do not rule out the possibility of shared genetic influence between cognitive ability and parenting style, this study implies that the early intellectual development of children could be improved by intervention in parenting practices. Parent-training programmes have been shown to be successful in improving a range of outcomes including maternal psychosocial health[32] and emotional and behavioural adjustment in children under 3 years of age.[33] In the UK, the Sure Start project was launched in 1999 targeting preschool children and their families, in disadvantaged areas, with a number of interventions including good quality play, learning and child care.[34] Recent evidence suggests that enrolled families showed less negative parenting and provided a better home-learning environment.[35] The findings presented in this paper suggest that successful parenting interventions may improve the transfer of cognitive skills between generations thereby protecting disadvantaged families from unintentionally placing their children at risk of being on a path of continual negativity.

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KEY MESSAGES

- The findings from this population-based multigenerational longitudinal study indicate that an intellectual home environment, parental aspiration and cognitive stimulation are positively associated with offspring cognitive ability whereas coercive discipline resulted in lower offspring ability scores.
- Interventions aimed at improving parenting practices may break the cycle of disadvantage associated with continuities in low cognitive ability.

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