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Abstract

This paper examines how family background affects the influence of childhood ability on educational attainment and future earnings. In it, we find that ability measured by various IQ tests taken at age 12 predicts future success for males about equally well. And that his returns to ability based on his earnings at age 43 and 53 are rather stable. For females, however, explanatory power and returns of various IQ scores are falling over time.

We also find that cognitive ability is rewarded differently across families. The observed differences are consistent with the idea that accessibility to family resources influences the educational attainment of children, and therefore future earnings. We find that fortunate families are better equipped to provide their low ability scoring children with compensating human capital to overcome early learning deficiencies. And we find that imperfect credit markets especially hit smart boys coming from poor families where lacking resources restrict their educational career.

JEL classification: I20, J20, J30

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Measuring family effects on future returns to childhood ability

1 Introduction

Many studies show that children from high educated families receive more schooling than children raised in low educated families. In economics this structural family relation is largely explained using models that rest on utility maximization. If parents choose to consume and invest in their children's human capital, these models show that more family income, earned on average by highly educated parents, stimulate their children's schooling. Yet this does not imply that a better access to financial resources is the decisive factor. Other factors like the inheritance of superior genes, more favorable academic environment, or higher aspirations may be decisive too.

The problem is that all these factors suffer from interdependence. Suppose that it is ability rather than income that is the driving force. Since high earning parents are on average better endowed than low earning parents, children from high earning families are more successful by virtue of their superior genes. The fact that these children who do well in school come from high income families proves nothing.

Thus, to determine whether family income matters for children's education, no clear answer is found by linking family income to the educational attainment of children. What we do in this paper is to look at specific situations where money can play a more distinctive role. That is, we consider the performance of smart children coming from poor families and less intelligent children from rich families. If children score high on early IQ tests, we hypothesize that poor families lack the financial resources to exploit their children's potential to the fullest. And if children perform poorly on particular ability tests, wealthy families are presumed to be more likely to repair these poor performances, for example, through costly tutoring.

For our analysis we go back to 1952 when a cohort of 12 years old school children in the Dutch province of Noord-Brabant were tested regarding their learning potential. Also information was gathered about their family background. In 1983 and 1993 the same children were contacted again about their school career, labor market status, family conditions and so on. With this unique information at hand we set out the following route.

At the first stop we present some baseline results on effects of learning potential measured as various IQ scores in 1952 on future outcomes like educational attainment, and earnings in 1983 and 1993. Thereby we shed some light on the importance of cognitive ability measures as predictors of future success.[2] From

[2]This old issue about individual success in life was renewed by the controversial book *The Bell Curve* where Herrnstein and Murray put the emphasis on ability as the driving force.

here on we continue with possible effects of family financial resources on future outcomes mediated through cognitive ability scores. We examine whether IQ measures are rewarded differently for children from different social background, and whether these differences correspond with the hypothesized effects. That is, smart children in poor families face credit constraints, and less intelligent children in fortunate families benefit from a better access to financial resources.

The remainder of this paper is organized as follows. In Section II we introduce the model describing the relation between cognitive ability, family background and future outcomes. Section III describes the data from the Brabant Survey in more detail. Data we will use throughout the paper. Section IV presents and discusses our empirical findings. And Section V summarizes the conclusions.

We conclude that high ability children do better in terms of educational attainment and future earnings. Furthermore, our results suggest that returns to ability are affected by family background merely according to our hypothesized effects.

2 Cognitive ability, family background and future success

To get an idea on what we mean with ability, we begin quoting ideas on ability expressed by some economists. Becker (1993, p97) defines ability as those talents that are required to succeed in the economic sphere. Willis (1986, p550) refers to ability as the individual's capacity to translate human capital investments into higher productivity. Hamermesh and Rees (1988, p392) speak of ability as the earnings gap generated by both genetic differences and differences produced by early childhood experiences. And Hartog (1994, p2) defines ability simply as an individual's potential. To sum up, there seems to be a general understanding on what we mean with cognitive ability when we use it.

And how to measure ability? In the empirical literature ability is usually measured by IQ test scores. These IQ scores are built on the classical idea that people who do well on one test or subtest tend do well on others too. In practice IQ is defined the common factor of various test scores representing various cognitive abilities and is established with factor analysis. Again, there is a general understanding that IQ scores ignore specific and narrow cognitive abilities but measure general intelligence rather satisfactory (Spearman, 1927, reprinted in 1981; Carrol, 1993; Cawley, Conneely, Heckman and Vytlacil, 1996).

Their views have been widely critizised and today cracks in *The Bell Curve* are showing. Ability matters but is definitely not the driving force in explaining all future success (Ashenfelter and Rouse, 1999; Cawley, Heckman and Vytlacil, 1998; Currie and Thomas, 1995; Korenman and Winship, 1995; Heckman, 1995; Goldberger and Manski, 1995; Plug and Vijverberg, 2000).

With childhood IQ scores available we begin to examine the role of ability tests in explaining educational attainment and earnings. The economic literature is replete of studies that have examined the role of education on earnings, and there are many papers that combine the effects of ability and education on future earnings.[3] There are only a few papers that explicitly link early test scores up with education and future earnings. Their general finding is that IQ scores are significant predictors of education, and future earnings (Bound, Griliches and Hall, 1986; Zax and Rees, 1998; Currie and Thomas, 1999; Plug, Van Praag and Hartog, 1999).

To see whether a better access to family financial resources matters, we continue to examine the influence of social economic background characteristics on ability tests and future outcomes like education and earnings. We use social background variables to mimic access to family financial resources because direct measures of family income are unavailable. Potential dangers using this approach will be discussed later on in this paper. There are various mechanisms through which access to financial resources measured by socioeconomic background variables influences future success.

The first mechanism is obvious. If ability is thought to be heritable, the ability of children will vary with their socioeconomic background. Here ability and socioeconomic background are directly linked. Fortunate families produce fortunate children who do well in school and the labour market.[4] There is a substantial empirical literature to support this idea that higher educated parents and more family income stimulate further schooling of their children (Haveman and Wolfe, 1995). But since pure human capital and ability effects run through parental income as well, these empirical findings do not prove that parental income matters per se. There are only a few examples that overcome the endogeneity of income with respect to ability transfers between parents and offspring using that component of family income that represents luck (Shea, 1997; Plug, 1999; Plug and Vijverberg, 2000). They show that to some extent educational careers of children are influenced by income, however, they do not show whether it is the intelligent or the less intelligent child that suffers.

The second mechanism is therefore less obvious and stresses the importance of access to family resources during the early school years. If parents are aware that early learning begets later learning and that early success breeds later success just as early failure breeds later failure (Heckman, 1999), parents will realize that a poor performance might be damaging for their children's career

[3]The earnings gap generated by schooling hides the fact that individuals in different levels of schooling are different. That is, people who are smarter are likely to obtain more schooling but that, at the same time, such people might be more productive and earn more than average to begin with. This omission is referred to as ability bias. However, when it comes to predicting an individual's earnings IQ scores play a minor role in generating returns compared with the actual years spent at school (Griliches, 1977; Willis and Rosen, 1979; Levin and Plug, 1999).

[4]Card (1994) suggests that diminishing returns to additional ability create price differences that depend on socioeconomic status. Because low socioeconomic families produce children who perform less on these test scores, the marginal returns are higher.

and their accumulation of human capital. To prevent this from happening, well-to-do families are more likely to provide their children with compensating human capital to overcome early learning deficiencies expressed by low test scores. With costly additional tutoring Currie and Thomas (1999) illustrate this mechanism.

The third mechanism stresses the importance of access to family resources at the end of the school career. If poor families with limited financial resources are more likely to face liquidity constraints when investing in their children's human capital, smart children are restricted in their pursuit of more and higher education.

For modelling these latter mechanisms, we assume the simplest wage equation to be

$$\ln w = \alpha_0 + \alpha_{1l} a_{ll} + \alpha_{1h} a_{lh} + \beta_{1l} a_{hl} + \beta_{1h} a_{hh} \tag{2.1}$$

where

a_{ll}	poor family background, low test score
a_{lh}	poor family background, high test score
a_{hl}	rich family background, low test score
a_{hh}	rich family background, high test score

For each category these abilities are measured by childhood test scores, and are defined zero otherwise. Now, if low scoring children from fortunate families will end up with more human capital through additional parental investments, we should find this unobserved component of behavior back in the parameters such that

$$\alpha_{1l} < \beta_{1l}$$

And if smart children from poor families face credit constraints when funding their education, these children will end up having less human capital. Again, if this is true this effect should be picked up by the parameters such that

$$\alpha_{1h} < \beta_{1h}$$

3 Data

This paper employs data from the Brabant survey. The collection of this data source started in 1952 when information was gathered from a cohort of 8th graders (about age 12) in the Dutch province of Noord-Brabant. The information in that first wave relates to their learning potential (raw scores for different subtests, and standard IQ tests) and the children's social background (parents' education, father's occupation, numbers of older and younger sibling). Thirty years later (in 1983) the original sample was approached again to obtain information about their schooling career and their labour market position. The

main objective of this second wave was to build a dataset suitable for empirical labour market analyses with the advantage of having a set of unique early ability measures. In 1993 it was decided to approach the same sample of persons once more in order to collect new information about their labour market experiences between their early 40s and 50s. The variables we use in this analysis can be divided into three groups: ability variables, social background variables, and variables reflecting on future success. We discuss each group in turn.

For ability, we have several marks on various specific school tests and three different IQ scores. These IQ measures are IQ LOIV, IQ PM and IQ WS. The IQ LOIV score is constructed from six subtests relating to regularities (patterns, order, systematic) in series of numbers, analogies in figures, and words, verbal similarities and relations, and spatial orientation. The second IQ PM score which is the outcome of Raven's progressive matrices test (Raven, 1938) focuses on mathematical abilities. And the third score is the IQ WS test and intends to measure verbal ability. Another source of information that reflects on the children's learning potential are marks on various schooltests. Five of them relate to mechanical reasoning, mathematics knowledge, reading comprehension, word knowledge, and clarity of expression. To make these separate scores comparable with our three IQ scores, we use these five scores as primary factors and construct a fourth IQ measure with factor analysis (labeled IQ (based on) F(ive) T(ests)).[5]

For social background, we have information on the social background observed by the school teacher when the child was in sixth grade. From that we know the level of education of both parents (translated into years of schooling). We know the father's occupation, measured in three levels: low, intermediate and high. Furthermore, the teacher was asked to rate the social standing of the family. From that opinion we classify normal and antisocial families. We also have other family characteristics, like the number of siblings, order of birth and cohabiting status of the parents.

For future outcomes we use the 1983 and 1993 sample from which we are able to measure the educational attainment in years of initial schooling. We also include financial variables measured as hourly net earnings measured in 1983 and 1993. Descriptive statistics appear in Table 1.

4 Results

We begin with our cognitive ability measures. The degree to which all four IQ scores measure general intelligence is expressed in Table 2. We find that all the simple correlation coefficients are rather high spanning the range 0.334-0.788, and that gender differences are not observed.

Table 3 and 4 presents the estimation results where all four ability scores are used to explain future outcomes. If ability is an important factor in explaining

[5]The exact IQ FT calculations are presented in Appendix A.

future success, the ability coefficient should be significant and the contribution to the overall fit of the model should be considerable. With all ability measures normalized to have a mean of zero and a standard deviation of one, we find in Table 3 that all our IQ scores matter. High scores on childhood IQ tests raise the number of years of schooling, and generate more income in the years 1983 and 1993. Compared with our findings in Table 4, we observe higher returns for ability for males than for females. Over time we find that male returns to ability are rather stable and are falling for females. There are no substantial differences between the returns for all four ability measures.

The R squares reflect on the explanatory power of these ability measures on future outcomes. For our IQ FT measure the explained variation in education and wages substantial and goes from 11 up to 17 percent for males. For females, the contribution is much lower and varies between 4 and 9 percent. The other ability measures tell a similar story. IQ matters but most of the variation in education and earnings remains unexplained.

In the same Tables 3 and 4 we tabulate our estimates when we control for social background variables. Two effects summarize this exercise. First, we find only marginal changes in all four ability returns for both males and females. And second, we find, not surprisingly, that inclusion of social background variables increase the explanatory power of the various models. Tables 3 and 4 serve as an interesting starting point, but our main interest deals with potential effects of family financial resources on future outcomes mediated through cognitive ability scores.[6]

To examine whether IQ measures are rewarded differently for children from different social background, we create a socioeconomic status index with variables that are used in developing these measures: fathers and mothers education based on years of education, an occupation index of the father, and an subjective index corresponds that with the teacher's evaluation. With parental education we take the average years of education of both parents and construct three groups based on four quartiles of the average education distribution. The bottom quartile and upper quartile are classified 1 and 3. The middle quartiles are classified 2. The levels of the father's occupation are low, intermediate and high and are set at 1, 2 and 3. The teacher's opinion is classified similarly. If families are evaluated as antisocial this index equals 1, normal families are set at 2. If all these three indexes convey information on the families socioeconomic background (and their financial situation) we are able to make one index in a similar fashion to the way IQ scores are constructed.[7] In the first stage primary

[6] Attrition may be thought of as a serious problem since high ability children are more likely to remain observations in our Brabant sample. However, the results in Table 3 and 4 continue to hold when we restrict our sample to those who are observed both in 1983 and 1993 suggesting that our findings do not suffer substantially from selection effects.

[7] The degree to which all three social index scores measure the same thing is not high. Simple correlation coefficients range from 0.104 to 0.138 for males and 0.062 to 0.116 for females.

factors are found from the scores on these three index, and in the second stage the common factor is found from factor analysis on the primary factor score. In Table 5 the factor loadings are presented. Each index is about equally weighted in our primary factor explaining about 40 percent of all variation in the three different socioeconomic indexes.

With this new index we distinct children from fortunate and less fortunate families. With standardized scores, well-to-do families are those families with a positive index, poor families have negative ones. We apply the same procedure to make a distinction between smart and less intelligent children. Positive standardized IQ scores define smart children. Negative scores define the less intelligent. With these classifications we estimate equation (2.1). Results are presented in Tables 6 and 7. Note that in these analysis we include all sociobackground variables, but report only the relevant ability coefficients. From these results it is clear that IQ measures are rewarded differently for children with different social backgrounds. But does family background affect the ability returns in the expected way?

The first noticeable regularity in all our estimates presented in Table 6 and 7 is that ability effects of low ability children from poor families are smaller than the marginal ability effects of smart children from rich families. This is observed for males, females, all IQ measures, and all future outcome variables. There are only two exceptions for male IQ PM returns on education and 1983 earnings. It is quite conceivable that these findings suggest that childhood ability is the underlying mechanism for explaining future success, but the problem is that these results cannot distinct ability from social background effects.

This brings us to the second regularity in our findings. If we look at the differences between low IQ children brought up in poor and well-to-do families, we find that children from fortunate families are more successful. Again, this observation holds for all future outcome variables education and earnings in 1983 and 1993, for males, females, and for all IQ measures. This clearly suggests that parental income matters. If children perform poorly on particular ability tests, wealthy families are able to provide their children with additional compensating human capital.

And what about family background effects for intelligent children? Again, we find what we expect. Almost all parameters are higher for wealthy families, except for male relations between IQ PM and education, and IQ FT and earnings in 1983. From this, we conclude that smart boys are on average more successful if they come from fortunate families which suggests that poor families lack the financial resources and restrict the educational career of their intelligent sons. For girls, on the other hand, we have mirrored observations. This is not entirely surprising and reflects on traditional family structures in the early fifties. In these days when males were considered the only earner in the family, parents rather invested in the human capital of sons than in the human capital of daughters.

At first sight, we are inclined to say that a better access to family resources

truly matters. Poor families face credit constraints while financing their children's schooling career. And fortunate families are more capable of compensating their offspring for early learning deficiencies, and more capable to exploit their son's talents to the fullest. Yet, closer inspection suggests that we should treat our estimates with care. In Table 8 F tests reporting on the significance of these estimated differences are less supportive. To the question does parental money matter for low scoring children, all 24 answers are positive but only 5 are statistically significant. To the question does absence of parental money restrict high scoring boys, 10 out of 12 answers are positive of which only 2 are statistically significant.[8]

To determine why our estimates provide only little evidence that family income matters, it is instructive to return to our key variables: IQ and family background. In our analysis we use four different IQ measures, and find for all four similar results. This tells us that our ability estimates measured through these IQ measures are pretty robust and are therefore not our biggest concern. More problematic is the way we treat our family background measure. According to theory, we argue that family effects are mediated through absent or affluent access to financial resources of the family. In this paper, however, access to family resources is not based on family income but on a mixture of related variables: parental education, parental occupation and the teacher's opinion on the families social status. Although this approach is not uncommon in sociology, we are quite convinced that we measure access to family resources with considerable error. And that our estimates suffer from this measurement error. The consequences, however, are not that devastating with respect to our proclaimed income effects. If our IQ measure picks up some of the mismeasured families financial situation, the interactions between high IQ and affluent parental resources and between low IQ and insufficient parental resources serve as corrections for potential measurement errors. Since the opposite holds for high ability children in poor families and low ability children in rich families, we end up underestimating the parental income effects if we compare low and high ability children between poor and rich families.

5 Concluding remarks

In this paper we exploit the role of the family in explaining educational achievement and future earnings. The family factors we examine are (inherited) ability and access to family financial resources. The evidence we offer suggests that both ability measured as childhood IQ scores and access to family financial resources proxied by parental eduction, parental occupation and the teacher's

[8] A possible reason why our F tests are not that supportive is that the measures we use to rank the ability and family background of children are not distinctive enough. However, when we divide both IQ and family background into three or four ordered categories instead of two and compare only the extremes, we obtain similar results.

family rating matter for educational attainment, and earnings in 1983 and 1993.

However, if we want to compare the role of family resources and ability these results do not offer a satisfactory interpretation since both factors are clearly connected. High ability parents produce high ability children, but also generate more income. To see whether a better access to family resources actually matters it is more instructive to look at behavior of smart children coming from poor families and less intelligent children from rich families.

This is what we do, and we find some evidence that income matters. We observe that children of low ability benefit from having fortunate parents. This result is consistent with the idea that if (normal) parents realize that a poor performance might be damaging for their children's career, well-to-do parents are better equipped to repair their children's learning deficiency through additional education. Furthermore, we observe that boys of high ability suffer if parental resources are insufficiently available. This result is consistent with the idea that poor families are unable to finance the (educational) career of their sons.[9]

Yet we have to be cautious about drawing inferences since we utilize data referring to only one particular province in the Netherlands at only one particular point in time. With respect to our ability effects a generalization does not seem to be an outrageous assumption. Our findings do not substantially differ from earlier studies. However, with respect to effects created by a better access to family resources generalizations seem too farfetched. Because school funding systems differ between countries, and evolve over time, influences of parental income on educational attainment and therefore future earnings will be different across countries and time too.

Appendix A

The IQ FT score is the common factor of five subtests relating to mechanical reasoning, mathematics knowledge, reading comprehension, word knowledge, and clarity of expression. The common factor is formed by taking principal components of the correlation matrix of the five test scores. The component associated with the largest eigenvalue is multiplied by the test scores and produced our IQ FT score.

Results in Table A1 show that the common factor explains 56 and 61 percent of all the variance in the matrix of correlations of the five test scores. We find that the weights that establishes our IQ FT measure are almost the same for each of the five tests for both sexes. Moreover, we observe no structural gender differences in our ability measures since the weights for all factors are remarkably similar. Our findings correspond to the findings of Cawley et al. (1996).

[9]For girls, however, we observe the opposite. This is in line with the spirit of the fifties where catholic girls rather pursued a career in the marriage than a career in school and labour market.

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Table 1: Descriptive statistics, means and standard deviations and observations

	males			**females**		
ability measures						
IQ FT	100.000	*15.000*	876	100.000	*15.000*	604
IQ LOIV	101.057	*13.758*	876	102.811	*13.975*	604
IQ PM	101.860	*14.413*	876	102.334	*13.996*	604
IQ WS	100.982	*13.663*	876	103.005	*13.906*	604
social background variables						
teachers evaluation	0.102	*0.303*	876	0.056	*0.230*	604
education father	8.603	*1.876*	876	8.215	*2.103*	604
education mother	8.463	*1.707*	876	8.061	*1.846*	604
father's occupation level						
low	0.423	*0.494*	876	0.256	*0.437*	604
intermediate	0.307	*0.461*	876	0.309	*0.462*	604
high	0.081	*0.273*	876	0.064	*0.245*	604
level unknown	0.188	*0.391*	876	0.369	*0.482*	604
other family characteristics						
number of siblings	4.940	*2.702*	876	5.051	*2.625*	604
order of birth	3.442	*2.408*	876	3.562	*2.438*	604
complete family	0.949	*0.218*	876	0.958	*0.199*	604
future outcomes						
years of education	9.044	*3.452*	876	8.913	*3.039*	604
log earnings 1983	2.724	*0.302*	645	2.453	*0.497*	241
log earnings 1993	3.036	*0.380*	448	2.840	*0.393*	128

Standard deviations in italics

Table 2: Correlations between four IQ scores

males	IQ FT	IQ LOIV	IQ PM	IQ WS
IQ FT	1.000			
IQ LOIV	0.729	1.000		
IQ PM	0.425	0.567	1.000	
IQ WS	0.788	0.616	0.350	1.000

females	IQ FT	IQ LOIV	IQ PM	IQ WS
IQ FT	1.000			
IQ LOIV	0.719	1.000		
IQ PM	0.444	0.562	1.000	
IQ WS	0.753	0.604	0.334	1.000

Table 3: Male education and earnings estimates

males	education		log earnings 1983		log earnings 1993	
cognitive ability						
IQ FT	1.296	*0.108****	0.124	*0.010****	0.134	*0.017****
constant	9.044	*0.108****	2.720	*0.010****	3.011	*0.017****
R^2	0.141		0.169		0.111	
N	876		645		448	
other cognitive ability measures						
IQ LOIV	1.172	*0.109****	0.108	*0.011****	0.122	*0.017****
R^2	0.115		0.129		0.098	
IQ PM	0.744	*0.114****	0.069	*0.011****	0.067	*0.017****
R^2	0.046		0.053		0.032	
IQ WS	1.162	*0.109****	0.112	*0.011****	0.123	*0.017****
R^2	0.113		0.131		0.102	
cognitive ability						
IQ FT	1.046	*0.121****	0.101	*0.012****	0.115	*0.020****
social background variables						
education father	0.296	*0.100****	-0.002	*0.009*	-0.007	*0.014*
education mother	0.090	*0.108*	0.016	*0.010*	0.011	*0.016*
father's occupation level						
intermediate	0.730	*0.253****	0.082	*0.023****	-0.006	*0.041*
high	1.133	*0.416****	0.150	*0.038****	0.104	*0.064*
level unknown	1.387	*0.297****	0.195	*0.075****	0.088	*0.045**
teachers evaluation	-1.260	*0.353****	-0.089	*0.035***	-0.137	*0.064***
other family characteristics						
number of siblings	0.055	*0.052*	0.008	*0.005**	0.002	*0.008*
order of birth	0.003	*0.059*	-0.007	*0.006*	-0.020	*0.009***
complete family	0.847	*0.495**	0.052	*0.059*	-0.164	*0.092**
constant	5.718	*0.778****	2.490	*0.087****	3.170	*0.129****
R^2	0.200		0.219		0.150	
N	876		645		448	
other cognitive ability measures						
IQ LOIV	0.929	*0.119****	0.089	*0.012****	0.101	*0.019****
R^2	0.189		0.202		0.142	
IQ PM	0.480	*0.114****	0.045	*0.011****	0.046	*0.018***
R^2	0.149		0.157		0.100	
IQ WS	0.867	*0.118****	0.078	*0.012****	0.103	*0.019****
R^2	0.182		0.191		0.144	

Table 4: Female education and earnings estimates

females	education		log earnings 1983		log earnings 1993	
cognitive ability						
IQ FT	0.926	*0.117****	0.105	*0.032****	0.082	*0.033***
constant	8.913	*0.117****	2.400	*0.034****	2.805	*0.037****
R^2	0.093		0.042		0.044	
N	604		241		128	
other cognitive ability measures						
IQ LOIV	0.984	*0.117****	0.108	*0.030****	0.076	*0.033***
R^2	0.104		0.049		0.039	
IQ PM	0.625	*0.121****	0.086	*0.032****	0.033	*0.032*
R^2	0.042		0.029		0.008	
IQ WS	0.820	*0.119****	0.040	*0.032*	0.049	*0.033*
R^2	0.072		0.006		0.017	
cognitive ability						
IQ FT	0.951	*0.151****	0.072	*0.037**	0.086	*0.041***
social background variables						
education father	0.083	*0.109*	0.019	*0.022*	-0.017	*0.031*
education mother	-0.033	*0.127*	0.012	*0.028*	0.027	*0.035*
father's occupation level						
intermediate	0.314	*0.310*	0.189	*0.070****	0.141	*0.092*
high	0.323	*0.522*	0.181	*0.100**	0.250	*0.127**
level unknown	1.288	*0.301****	0.070	*0.205*	0.221	*0.095***
teachers evaluation	-1.410	*0.504****	-0.135	*0.140*	-0.007	*0.231*
other family characteristics						
number of siblings	0.074	*0.060*	0.008	*0.017*	0.004	*0.019*
order of birth	0.050	*0.063*	-0.006	*0.018*	0.009	*0.019*
complete family	0.500	*0.591*	0.193	*0.199*	0.127	*0.141*
constant	6.949	*0.974****	1.845	*0.295****	2.405	*0.283****
R^2	0.145		0.110		0.109	
N	604		241		128	
other cognitive ability measures						
IQ LOIV	0.912	*0.138****	0.061	*0.0350**	0.071	*0.037**
R^2	0.151		0.108		0.102	
IQ PM	0.464	*0.127****	0.058	*0.033**	0.025	*0.035*
R^2	0.109		0.108		0.079	
IQ WS	0.729	*0.137****	-0.001	*0.034*	0.036	*0.037*
R^2	0.130		0.096		0.083	

Table 5: Principal component analyses and socioeconomic background

males	factor 1	factor 2	factor 3
level father's occupation	0.585	-0.499	0.639
teacher's social rating	0.544	0.826	0.146
average years of parental schooling	0.601	-0.261	-0.754
explained proportion	*0.412*	*0.300*	*0.286*

females	factor 1	factor 2	factor 3
level father's occupation	0.625	-0.268	-0.732
teacher's social rating	0.491	0.864	0.102
average years of parental schooling	0.605	-0.424	0.672
explained proportion	*0.390*	*0.315*	*0.294*

Table 6: Socioeconomic status, education and earnings estimates

males	education		log earnings 1983		log earnings 1993	
cognitive ability						
poor family, low IQ FT	0.573	*0.232***	0.039	*0.023**	0.055	*0.048*
rich family, low IQ FT	0.932	*0.379***	0.111	*0.039****	0.225	*0.073****
poor family, high IQ FT	1.108	*0.339****	0.141	*0.031****	0.085	*0.053*
rich family, high IQ FT	1.556	*0.237****	0.141	*0.024****	0.130	*0.033****
R^2	0.208		0.231		0.162	
N	876		645		448	
cognitive ability						
poor family, low IQ LOIV	0.360	*0.270*	0.029	*0.027*	0.037	*0.047*
rich family, low IQ LOIV	0.697	*0.378**	0.045	*0.042*	0.149	*0.061***
poor family, high IQ LOIV	0.773	*0.339***	0.078	*0.032***	0.093	*0.056**
rich family, high IQ LOIV	1.444	*0.241****	0.137	*0.024****	0.129	*0.036****
R^2	0.192		0.202		0.153	
cognitive ability						
poor family, low IQ PM	0.437	*0.265*	0.059	*0.027***	-0.012	*0.047*
rich family, low IQ PM	0.853	*0.359***	0.095	*0.040***	0.124	*0.055***
poor family, high IQ PM	0.440	*0.317*	0.018	*0.030*	0.031	*0.047*
rich family, high IQ PM	0.353	*0.245*	0.030	*0.024*	0.052	*0.037*
R^2	0.150		0.160		0.111	
cognitive ability						
poor family, low IQ WS	0.617	*0.268****	0.057	*0.027****	0.099	*0.050****
rich family, low IQ WS	1.063	*0.353****	0.123	*0.036****	0.165	*0.060****
poor family, high IQ WS	0.779	*0.319****	0.084	*0.031****	0.057	*0.048*
rich family, high IQ WS	1.194	*0.238****	0.103	*0.026****	0.100	*0.034****
R^2	0.192		0.206		0.146	

Table 7: Socioeconomic status, education and earnings estimates

females	education		log earnings 1983		log earnings 1993	
cognitive ability						
poor family, low IQ FT	0.257	*0.281*	-0.207	*0.103***	-0.028	*0.118*
rich family, low IQ FT	1.036	*0.836*	-0.151	*0.185*	0.276	*0.245*
poor family, high IQ FT	1.873	*0.316****	0.185	*0.059****	0.099	*0.066*
rich family, high IQ FT	0.893	*0.272****	0.120	*0.065**	0.087	*0.076*
R^2	0.163		0.144		0.124	
N	604		241		128	
cognitive ability						
poor family, low IQ LOIV	0.553	*0.284***	-0.132	*0.091*	-0.017	*0.110*
rich family, low IQ LOIV	1.278	*0.476****	0.194	*0.140*	0.321	*0.125***
poor family, high IQ LOIV	1.364	*0.371****	0.129	*0.078*	0.050	*0.079*
rich family, high IQ LOIV	0.810	*0.266****	0.087	*0.061*	0.018	*0.073*
R^2	0.156		0.134		0.145	
cognitive ability						
poor family, low IQ PM	0.045	*0.277*	-0.107	*0.085*	-0.021	*0.092*
rich family, low IQ PM	0.496	*0.416*	0.016	*0.102*	0.167	*0.101*
poor family, high IQ PM	0.921	*0.342****	0.149	*0.081**	-0.031	*0.085*
rich family, high IQ PM	0.541	*0.271***	0.132	*0.064***	0.001	*0.077*
R^2	0.114		0.126		0.105	
cognitive ability						
poor family, low IQ WS	0.079	*0.290*	-0.168	*0.108*	-0.015	*0.103*
rich family, low IQ WS	0.205	*0.439*	-0.083	*0.109*	0.154	*0.143*
poor family, high IQ WS	1.559	*0.313****	0.109	*0.065**	0.046	*0.074*
rich family, high IQ WS	0.892	*0.273****	-0.001	*0.069*	0.005	*0.078*
R^2	0.145		0.112		0.091	

Table 8: Test results and the importance of socioeconomic status

males	education		log earnings 1983		log earnings 1993	
Does money matter for less intelligent children in fortunate families?						
IQ FT	yes	0.75	yes	2.80*	yes	4.27**
IQ LOIV	yes	0.64	yes	0.12	yes	2.53
IQ PM	yes	1.06	yes	0.66	yes	4.32**
IQ WS	yes	1.28	yes	2.50	yes	0.86
Does money matter for intelligent children in less fortunate families?						
IQ FT	yes	1.33	no	0.00	yes	0.58
IQ LOIV	yes	3.08*	yes	2.63*	yes	0.35
IQ PM	no	0.05	yes	0.11	yes	0.15
IQ WS	yes	1.27	yes	0.24	yes	0.61

females	education		log earnings 1983		log earnings 1993	
Does money matter for less intelligent children in fortunate families?						
IQ FT	yes	0.86	yes	0.08	yes	1.43
IQ LOIV	yes	2.01	yes	4.65**	yes	5.13**
IQ PM	yes	0.93	yes	0.98	yes	2.40
IQ WS	yes	0.07	yes	0.37	yes	1.01
Does money matter for intelligent children in less fortunate families?						
IQ FT	no	6.30**	no	0.63	no	0.01
IQ LOIV	no	1.70	no	0.21	no	0.10
IQ PM	no	0.88	no	0.03	yes	0.09
IQ WS	no	2.92*	no	1.62	no	0.15

Table A1: Principal component analyses and intelligence

males	factor 1	factor 2	factor 3	factor 4	factor 5
mechanical reasoning	0.418	0.827	-0.012	0.353	0.121
mathematics knowledge	0.423	-0.129	0.847	-0.229	0.180
reading comprehension	0.473	0.091	-0.247	-0.573	-0.614
word knowledge	0.454	-0.471	-0.045	0.677	-0.332
clarity of expression	0.462	-0.260	-0.467	-0.188	0.681
proportion	*0.612*	*0.118*	*0.113*	*0.084*	*0.071*

females	factor 1	factor 2	factor 3	factor 4	factor 5
mechanical reasoning	0.394	0.884	-0.204	0.061	0.131
mathematics knowledge	0.425	0.017	0.891	-0.142	0.056
reading comprehension	0.479	-0.140	-0.259	-0.476	-0.674
word knowledge	0.459	-0.251	-0.070	0.829	-0.180
clarity of expression	0.471	-0.367	-0.301	-0.245	0.701
proportion	*0.569*	*0.134*	*0.119*	*0.099*	*0.078*