Schooling in Capitalist America Revisited

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The project that eventually resulted in the publication of *Schooling in Capitalist America* (1976) began in 1968, stimulated by the then raging academic debates and social conflicts about the structure and purposes of education. We were then, and remain, hopeful that education can contribute to a more productive economy and a more equitable sharing of its benefits and burdens, as well as a society in which all are maximally free to pursue their own ends unimpeded by prejudice, lack of opportunity for learning, or material want. Our distress at how woefully the U.S. educational system was then failing these objectives sparked our initial collaboration. Its continuing failure has prompted our recent return to the subject.

The three basic propositions of the book deal with human development, inequality, and social change.

Concerning human development, we showed that while cognitive skills are important in the economy and in predicting individual economic success, the contribution of schooling to individual economic success could only partly be explained by the cognitive development fostered in schools. We advanced the position that schools prepare people for adult work rules, by socializing people to function well, and without complaint, in the hierarchical structure of the modern corporation. Schools accomplish this by what we called the *correspondence principle*, namely, by structuring social interactions and individual rewards to replicate the environment of the workplace. We thus focused attention not on the explicit curriculum but on the socialization implied by the structure of schooling. Our econometric

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investigations demonstrated that the contribution of schooling to later economic success is explained only in part by the cognitive skills learned in school.

Second, we showed that parental economic status is passed on to children in part by means of unequal educational opportunity, but that the economic advantages of the offspring of higher social status families go considerably beyond the superior education they receive. We used the then available statistical data to demonstrate that the U. S. fell far short of the goal of equal economic opportunity and that genetic inheritance of cognitive skill—as measured on standard tests—explains only a small part of the intergenerational persistence of status within families.

Finally, our historical studies of the origins of primary schooling and the development of the high school suggested that the evolution of the modern school system is not accounted for by the gradual perfection of a democratic or pedagogical ideal. Rather, it was the product of a series of conflicts arising through the transformation of the social organization of work and the distribution of its rewards. In this process, the interests of the owners of the leading businesses tended to predominate but were rarely uncontested. The same conflict-ridden evolution of the structure and purposes of education was strikingly evident in higher education at the time we wrote *Schooling in Capitalist America*, and we devoted a chapter to what we termed the contradictions of higher education. Later, in *Democracy and Capitalism* (1986), we developed the idea that schools and the public sector generally are loci of conflicts stemming from the contradictory rules of the marketplace, the democratic polity, and the patriarchal family.

How do we now view *Schooling in Capitalist America*? For most of the quarter of a century since it was published, we have researched subjects quite removed from the questions we addressed in *Schooling*. In recent years, however we have returned to writing about school reform, how economic institutions shape the process of human development, and the importance of schooling, cognitive skill, and personality as determinants of economic success and their role in the intergenerational perpetuation of inequality.

In light of the outpouring of quantitative research on schooling and inequality in the intervening years, the statistical claims of the book have held up remarkably well. In particular, recent research by us and others using far better data than were available in the early 70s has entirely vindicated our once-controversial estimates of high levels of intergenerational persistence of economic status (Section 1), the unimportance of the heritability of IQ in this process (Section 2), and the fact that the contribution of schooling to cognitive development plays little part in explaining why those with more schooling have higher earnings (see Section 3). Some additional research has supported our hypotheses concerning the role of personality traits, rather than skills *per se*, as determinants of labor market success (see Section 4). But progress has been halting in this area. We survey some of this recent

research in recent and forthcoming papers in the *Journal of Economic Literature* (2002), the *Journal of Economic Perspectives* (2001b) the *American Economic Review* (2001), and the *International Encyclopedia of the Social and Behavioral Sciences* (2001a). In Section! 5, we turn to the socialization process of schooling itself. In *Schooling in Capitalist America* we did not explore the individual-level learning processes that account for the effectiveness of the Correspondence Principle. Recent contributions to the study of cultural evolution (Cavalli-Sforza and Feldman 1981, Boyd and Richerson 1985, Bowles and Gintis 1986) allow us to be considerably more specific about how behaviors are learned in school.

1 Intergenerational Inequality

At the time we wrote *Schooling in Capitalist America*, there was a virtual consensus that the statistical relationship between parents' and children's' adult economic status is rather weak. The early research of Blau and Duncan (1967), for instance, firmly supported this view. Even twenty years later, researchers had not changed their minds. For instance, Becker and Tomes (1986) found that the simple correlations between parents' and sons' income or earnings (or their logarithms) averaged 0.15, leading the authors to conclude that, at least for white males, "[a]lmost all earnings advantages and disadvantages of ancestors are wiped out in three generations." (S32) Indeed, Becker (1988) expressed a widely held consensus when, in his Presidential address to the American Economics Association, he concluded: "…low earnings as well as high earnings are not strongly transmitted from fathers to sons."

But the appearance of such high levels of intergenerational mobility was an artifact of two types of measurement error: mistakes in reporting income and transitory components in current income uncorrelated with underlying permanent income (Atkinson, Maynard and Trinder 1983, Solon 1992, Zimmerman 1992). The low validity in both generations' incomes depressed the intergenerational correlation, and when corrected, the intergenerational correlations for economic status now appear to be quite substantial, on the order of twice or three times the average of the United States studies surveyed by Becker and Tomes (1986). The intergenerational correlations surveyed by Casey Mulligan (1997) for family consumption, wealth, income, and earnings average, respectively, 0.68, 0.50, 0.43 and 0.34. The upwards adjustment of the consensus estimates of the extent of intergenerational inequality has stimulated a revival of empirical research on the mechanisms accounting for parent-offspring similarity in economic status (See Behrman, Pollak and Taubman (1995) and Mulligan (1997).)

Thus *Schooling in Capitalist America* was correct: the extent of intergenera-

tional economic status transmission is considerable. In the United States, knowing the income or wealth of someone's parents is about as informative about the person's own economic status as is the person's own years of schooling attained, or score on a standardized cognitive test.

To show how we support this assertion, we represent the income of a member of the current generation as the sum of the effect of the parents' income, mean income in the second generation and an error term.

$$y = (1 - \beta_y)\bar{y} + \beta_y y_{\mathrm{p}} + \epsilon_y. \tag{1}$$

We use subscript'p' to refer to parental measures, so y is an individual's economic status, adjusted so that its mean, $\bar{y}$, is that of the parental generation, β_y is a constant, y_{p} is the individual's parental y, and ϵ_y is a disturbance uncorrelated with y_{p}. Rearranging terms we see that

$$y - \bar{y} = \beta_y(y_{\mathrm{p}} - \bar{y}) + \epsilon_y; \tag{2}$$

i.e., the deviation of the offspring's income from the mean income is β_y times the deviation of the parent from mean income, plus an error term. We will term β_y the "Galton measure" of intergenerational persistence (Galton used it to study the intergenerational persistence of height, which he found to be 2/3). The influence of mean income on the income of the offspring, $1 - \beta_y$ measures what is called regression to the mean for, as (2) makes clear, one may expect to be closer to the mean than one's parents by the fraction $1 - \beta_y$. The relationship between the Galton measure and the intergenerational correlation is given by

$$\rho_y = \beta_y \frac{\sigma_{y_{\mathrm{p}}}}{\sigma_y},$$

where σ_y is the standard deviation of y. We measure economic success using natural logarithms, β_y is the percentage change in offspring's economic success associated with a one percent change in parents' economic success. Table 1 presents estimates of the Galton measure. The extent of persistence—especially for income, wealth and consumption—is substantial.

How different are the probabilities of economic success for the children of the poor and the well off? Can the measures of persistence in Table 1 be translated into probabilities of obtaining high or low incomes conditional on the income level of one's parents? The intergenerational correlation coefficient is a greatly oversimplified measure, and may be unilluminating about the probabilities of economic success conditional on being the child of poor, or rich or middling parents. Calculating these conditional probabilities and inspecting the entire transition matrix gives a more complete picture. The results of a study by Hertz (2001b)appear in

Economic Characteristic	Number of Estimates	Range	Average
log family consumption	2	0.59–0.77	0.68
log family wealth	9	0.27–0.76	0.50
log family income	10	0.14–0.65	0.43[a]
log earnings or wages	16	0.11–0.59	0.34[a]
years of schooling	8	0.14–0.45	0.29[a]

Table 1: Intergenerational Persistence of Some Economic Characteristics, β_i. Source: Mulligan (1999)
[a]If recent studies of the U.S. only are included these averages are 0.35, 0.33, and 0.38 respectively.

Figure 1 with the parents arranged by income decile (from poor to rich moving from left to right) and with adult sons arranged by income decile along the other axis. The height of the surface indicates the likelihood of making the transition from the indicated parents decile to the son's decile. Though the underlying intergenerational correlation of incomes is a modest 0.36, the differences in the likely life trajectories of the children of the poor and the rich are substantial. The "twin peaks" represent those stuck in poverty and affluence (though we do not expect the term "affluence trap" to catch on). Point *A* for example indicates that a son born to the top decile has better than a 1 in 5 chance to attain the top decile, while *B* indicates that for the son of the poorest decile the likelihood is one in a hundred. *C* indicates that sons of the poorest decile have a 19% probability of attaining the lowest decile. Hertz' transmission matrix and other studies (Corak and Heisz 1999, Cooper, Durlauf and Johnson 1994, Hertz 2001a) suggest that distinct transmission mechanisms may be at work at various points of the income distribution. For example wealth bequests may play a major role at the top of the income distribution, while at the bottom vulnerability to violence or other adverse health episodes may be more important.

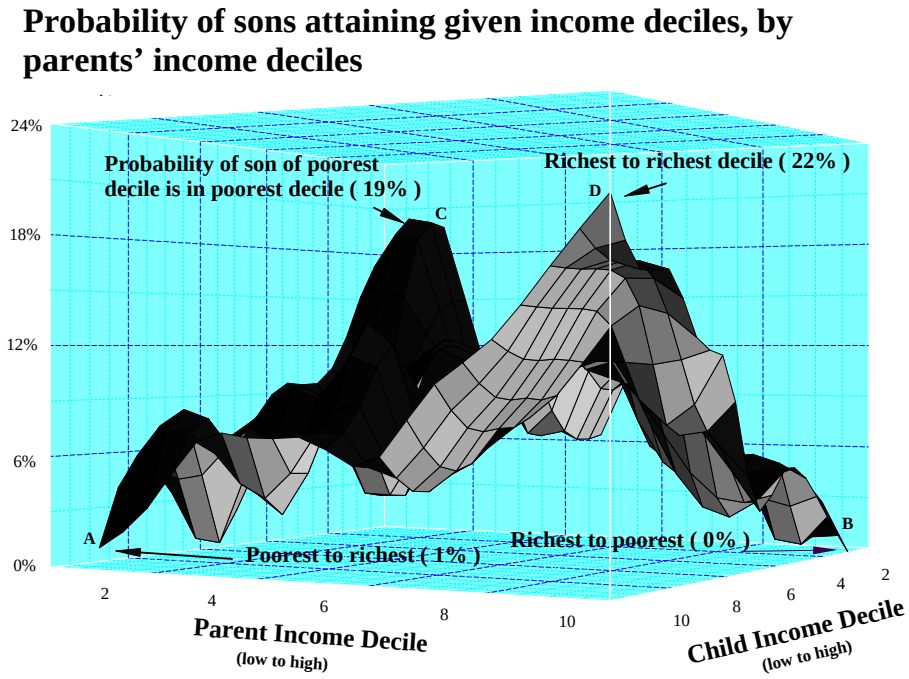

Figure 1: Intergenerational Income Transition Probabilities.
The height of the surface in cell (i, j) is the probability that an adult (30 or over) whose parents are in the ith decile of income will have an income in the jth decile. Point A, for example, indicates that a son born to the top decile has better than a one in five chance of attaining the top decile, while B indicates that a son born to the bottom decile has about one chance in one hundred to attain the top decile. The income of sons was averaged of the years 1984–1993 while parents' income was average over the years 1975–1993. The simple (age-adjusted) correlation of parents' and sons' incomes in the data set represented in the figure is 0.36, while the analogous correlation for single year for each (1975 and 1993 respectively) is only 0.16l. Source: Hertz (2001b), which includes the 10×10 transition matrix.

2 Nature and Nurture in Intergenerational Status Transmission

What accounts for the transmission of economic status from parents to offspring? There are only a few income-generating traits for which both economic relevance and parent-offspring similarity have been empirically demonstrated. Among these are cognitive performance, the level of schooling, and asset ownership. Our estimates (Bowles and Gintis 2001b) suggest that the fact that wealthy parents have wealthy offspring plays a substantial role in the intergenerational transmission of income. But here we focus on schooling and cognitive performance as concerns more central to the sociology of education.

We treat income as a phenotypic trait influenced by the individual's genotype g and environment e. Genotypic and environmental influences jointly determine individual skills and other traits relevant to job performance. Among the environmental influences are cultural transmission from parents, schools and other learning environments.

How important is IQ transmission in the intergenerational transmission process? Correlations of IQ between parents and offspring are substantial, ranging from 0.42 to 0.72, the higher figure referring to average parental vs. average offspring IQ (Bouchard and McGue 1981). The contribution of cognitive functioning to earnings has been established using survey data to estimate the natural logarithm of earnings y as a function of a measure of parental economic and/or social status y_{p}, years (and perhaps other measures) of schooling s, and performance on a cognitive score c—often, in U.S. data sets, the Armed Forces Qualification Test (AFQT).

We have located sixty-five estimates of the normalized regression coefficient of a test score in a an earnings equation for the U.S. over a period of three decades. These appear in Figure 2, where the vertical axis is the estimated coefficient and the horizontal axis gives the year to which the data apply. The mean of these estimates 0.15, indicating that a standard deviation change in the cognitive score, holding constant the remaining variables, changes the natural logarithm of earnings by about one seventh of a standard deviation. By way of contrast the mean value of the normalized regression coefficient of years of schooling in these studies is 0.22, suggesting a somewhat larger independent effect of schooling. There is no apparent trend in the estimated importance of cognitive performance as a determinant of earnings, casting some doubt on the widely-held view that the cognitive skill is becoming increasingly important as a determinant of economic success.

We investigated the sensitivity of the results reported above to a number of possible sources of error. First, we tested for effects of the age at which the test was taken and especially whether the respondent had completed schooling at the time. For about two thirds of the estimates we were able to determine if the test was taken before or after school completion. For these estimates there no effect of the timing

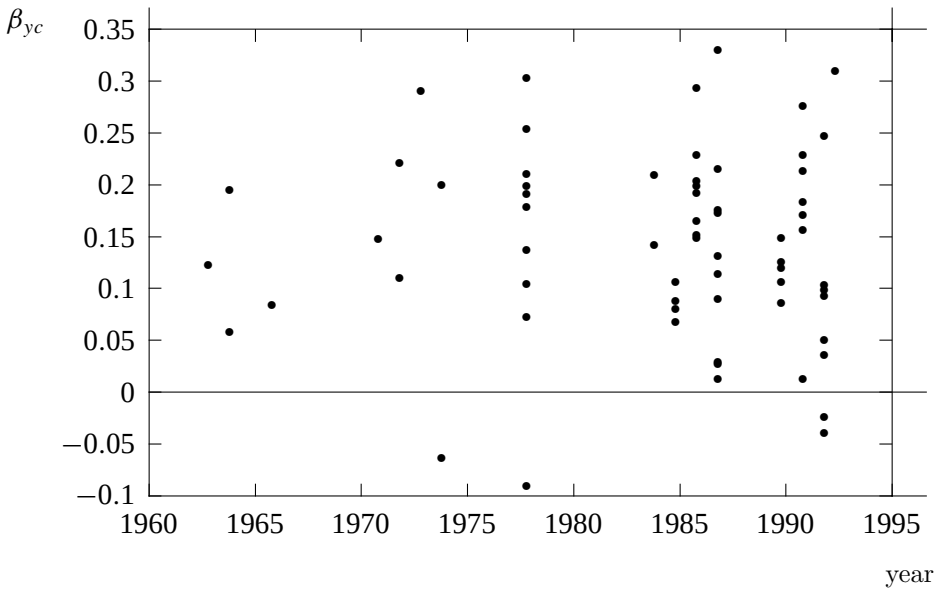

Figure 2: Normalized Regression Coefficient of Cognitive Score on the Logarithm of Income or Earnings by Year: Sixty Five Estimates from Twenty Four Studies (Bowles, Gintis and Osborne, 2002)

of the test on the measures reported above. Second, we investigated the importance of the type of test used, and found that studies using more comprehensive tests generally performed somewhat less well than those using more narrowly defined tests (often components of the more comprehensive test). However, the estimated effects were not even marginally significant (t-statistics less than unity) except for the estimate of the contribution of noncognitive traits to the returns to schooling. Here the more comprehensive tests yielded estimates about ten percent larger than the narrower tests.

What does do these results imply concerning the role of IQ transmission in status transmission? A way to formulate this question precisely is to ask how much lower would the intergenerational correlation be if there were no genetic inheritance of IQ, that is, if the correlation of parental and child genotypic IQ were zero. Inspecting the causal model in Figure 3 one can see that this involves severing the genetic link (r^{g}) and then calculating the implied hypothetical correlation between parental earnings and offspring earnings. The difference between this hypothetical calculation and the observed correlation is the genetic contribution *via* IQ to the intergenerational transmission of economics status.

To answer this question we need the answers to two further questions. First, what role does genetic inheritance of IQ play in the covariation of parental and

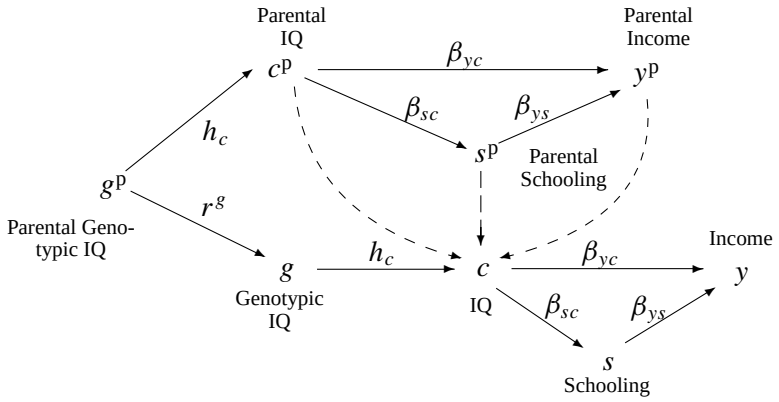

Figure 3: A Causal Model of Intergenerational Earnings Transmission.
Note: the causal paths generate the intergenerational status correlation $r_{y^{\mathrm{p}}y}$. Solid lines indicate the causal paths we use to calculate the genetic contribution (*via* IQ) to the similarity of incomes across generations.

offspring cognitive performance? Second, how important is cognitive performance as a direct and indirect (through educational attainments) determinant of earnings? The answer to the first question depends on two factors: the heritability of IQ, which is probably about 0.5, but cannot be greater than unity, and the genetic correlation (also 0.5). The answer to the second question depends on three factors: the influence of IQ on educational attainment, the influence of educational attainment on earnings, and the direct influence of IQ on earnings, independently of schooling.

The causal paths on which this calculation is based appear in Figure 3 as continuous arrows, the others as dashed arrows. We use representative estimates from the literature (most of them summarized in Bowles, Gintis and Osborne 2002a). We refer the reader to Bowles and Gintis (2001b) for details of the calculation. We conclude that the estimate of the normalized effect on earnings of the child's IQ (both directly and indirectly via schooling) is substantial: 0.266. We take this to be the relevant value for the parents' generation as well. We estimate the genetic contribution to the correlation of parental and offspring incomes as a maximum of 0.035, assuming IQ is perfectly heritable, or 0.018 making the more widely accepted assumption that about half the various in IQ is due to genetic inheritance.

If the genetic inheritance of IQ were the only mechanism accounting for the intergenerational income correlations, then, Figure 1 would represent a set of poorly laid bricks on a barely tilted surface rather than the urban skyline it in fact resembles. The likelihood that a child of the richest decile would attain the top income decile would exceed that of the poor by twelve *percent*, assuming IQ to be 50% heritable, rather than by the sixteen to forty four *times* observed in Figure 1.

3 How Does Schooling Affect Labor Market Success?

Individuals possess a vector of personal capabilities, c and sell these on the labor market at hourly prices p, with hourly earnings $w = pc$. The common assumption is that c consists of cognitive skills that depend on an individual's innate ability and level of schooling. We argued in *Schooling in Capitalist America* that cognitive skills are only a part of what is in c, and schooling does more than enhance cognitive skills.

Until recently this message has been widely ignored. The availability of data on cognitive performance scores on dozens of test instruments appears to have crowded out other reasonable hypotheses concerning less copiously measured individual attributes. Three examples of the importance of noncognitive traits that are important for labor market success are the following. The first is from a recent survey of 3,000 employers conducted by the United States Census Bureau in collaboration with the Department of Education (Bureau of the Census, 1998), which asked, "When you consider hiring a new nonsupervisory or production worker, how important are the following in your decision to hire?" Employers ranked "industry based skill credentials" at 3.2 on a scale of 1 (unimportant) to 5 (very important), with "years of schooling" at 2.9, "score on tests given by employer" and "academic performance" both at 2.5. By far the most important was "attitude" ranked 4.6, followed by "communication skills" (4.2).

The second example is from the far more detailed Employers' Manpower and Skills Practices Survey of 1693 British employers reported in Francis Green, Stephen Machin, and David Wilkenson (1998). Of the somewhat more than a third of the establishments reporting a "skill shortage", personnel managers identified the recruitment problem as "lack of technical skills" in 43 percent of the cases, but "poor attitude, motivation, or personality" in a remarkable 62 percent of the cases. Poor attitude was by far the most important reason for the recruitment difficulty given. The importance of motivation relative to technical skill was even greater among the full sample.

The third example is from a series of studies (James Heckman, Jingling Hsee, and Yona Rubinstein, 1999, Steven Cameron and James Heckman, 1993, Heckman, forthcoming) on the labor market impact of the GED, a diploma gained by a test of cognitive skills taken by a large fraction of dropouts from United States high schools. GED holders exhibit substantially better cognitive performance than other high school dropouts. But behavioral and personality problems, evidenced by delinquent and illegal behaviors, account for the fact that the GED's wages are barely higher than other less cognitively skilled dropouts and are perhaps ten percent below the levels which would be predicted on the basis of their cognitive skills and other conventional earnings determinants. Heckman and his coauthors reason that the

GED is a "mixed signal" indicating to employers that the individual had the cognitive skill to complete high school but lacked the motivational or behavioral requisites. Their data are also consistent with the view that the economic returns ot schooling depend on "seat time;" i.e., being there may be more important than learning the ew curriculum.

Sociological accounts frequently stress the non-skill related determinants of earnings and of the contribution of schooling to the economy, often under the heading of 'socialization for work' (Talcott Parsons, 1959, Robert Dreeben 1967). Until recently, economists have ignored this literature, arguing that an employer would be no more willing to pay a premium for the services of a 'well socialized' worker than a shopper would be to pay a higher price for the fruit of a 'well socialized' grocer. However this reason for ignoring noncognitive traits is inconsistent with the modern labor economics, which recognizes that the employment relationship is generally contractually incomplete and hence employee effort (and hence the delivery of productive services to the employer) depends on how employees respond to the various types and levels of incentives the firm presents to the employee.

Several examples of this dependence come to mind. First, a reduction in the employee's rate of time preference—that is, a greater orientation toward the future—it raises the importance to the employee of retaining the job in the future and thus in avoiding any behavior that might result in termination. Second, individuals differ greatly in the strength of their sense of personal efficacy, a trait frequently measured (inversely) by the so-called Rotter scale. Highly fatalistic, low efficacy persons believe that their actions have little impact on the outcomes they experience, so that by comparison with those with a greater sense of personal efficacy, more fatalistic people believe that their work effort has less effect on the probability of their job termination. Thus the threat of dismissal and the promise of reward have little incentive effect on those with high Rotter scores, and they will make poor employees. A third example is how helpful or disruptive an employee is in interacting with other employees.

The most direct test of the proposition that the contribution of schooling to the development of cognitive skills accounts for the effect of schooling on earnings is to ask if earnings covary with years of schooling in populations that are homogeneous with respect to level of cognitive skill (Gintis 1971). A positive answer in a well-specified model suggests that schools contribute to earnings by means other than their contribution to cognitive skill.

An approximation of this test is available. Suppose that the income-generating structure for a given demographic group is

$$y = \beta_s s + \beta_b b + \beta_c c + \epsilon \tag{3}$$

where y, s, b, and c measure earnings, schooling, parental socioeconomic back-

ground, and cognitive skill level, and ϵ measures stochastic influences on earnings uncorrelated with the other explanatory variables. Many estimates lack measures of cognitive skill and hence estimate

$$y = \beta'_s s + \beta'_b b + \epsilon', \tag{4}$$

with ϵ' representing the stochastic influences as above plus the influences of cognitive skill operating independently of demographic grouping, socioeconomic background and schooling. We can compare two estimated regression coefficients for a years-of-schooling variable, one in an equation like (3) in which a measure of cognitive skill also appears (β_s) and another like (4) in which the cognitive measure is absent (β'_s). The ratio of the first to the second, which we write as

$$\alpha = \frac{\beta_s}{\beta'_s}, \tag{5}$$

is an estimate of the contribution of traits other than those measured on the cognitive tests to the estimated return to schooling. We call this the "non-cognitive component of the returns to schooling."

If schooling affected earnings solely through its contribution to cognitive capacities (assuming these to be adequately measured by the test scores used), α would be zero, because the regression coefficient of years of schooling would fall to zero once the cognitive level of the individual is accounted for, there being (by hypothesis) no contribution of schooling to earnings beyond its effect on cognitive functioning. By contrast, if the contribution of schooling to cognitive skill explained none of schooling's contribution to earnings, α would be unity. The estimates involved are of course subject to biases, and we address this question at some length in Appendix 2 (available from authors). The most obvious potential problem—that the cognitive score might be measured with considerably more error than the schooling variable and hence α is upward biased—is almost certainly not the case.

For the United States over the period from the late 1950s to the early 1990s, we have been able to locate 25 studies allowing 58 estimates of the relationship between b_s and b'_s and thus an estimate of α. The data sources underlying this and the other figures in this paper are described in Appendix 1 (available from authors). Methods of estimation differ of course, and the demographic groups covered and the years for which the data apply vary considerably. We have surveyed these studies and selected what we considered the best specified estimates in each study. For example, we favored estimates using measurement error correction and instrumental variables estimation or other techniques to take account of endogeneity of the explanatory variables. We have included all studies available to us.[1]

The mean value of α in our studies is 0.82, meaning that introducing a measure of cognitive performance into an equation using educational attainment to predict earnings reduces the coefficient of years of education by an average of 18 per cent. The median for α was 0.84, and the range was 0.48 to 1.13. This suggests that a substantial portion of the returns to schooling are generated by effects or correlates of schooling substantially unrelated to the cognitive capacities measured on the available tests.[2]

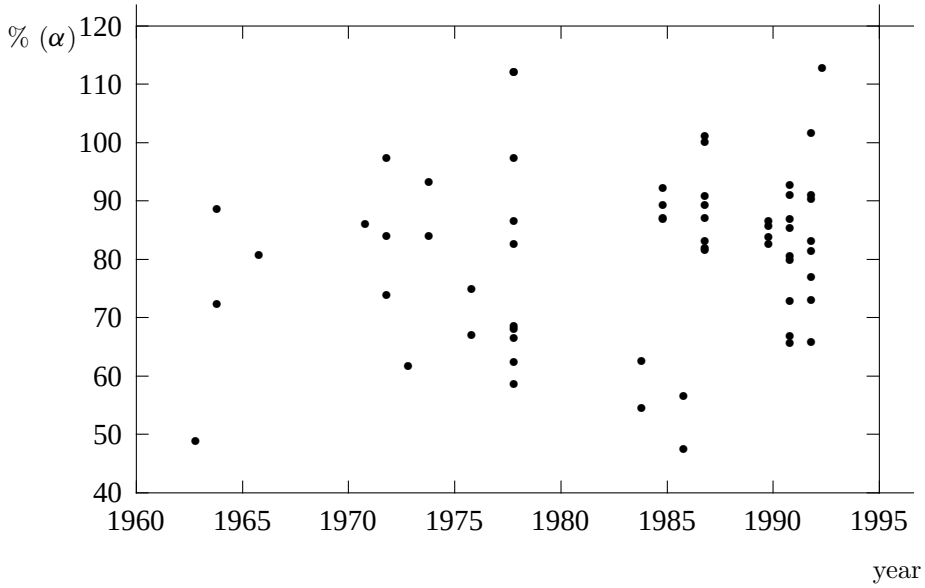

Figure 4: The Noncognitive Component Fraction, α, of the Private Return to Schooling over Time: A Summary of Fifty Eight Estimates from Twenty Five Studies

In Figure 4 we present these data, along with the years to which the earnings

[1]We have located 5 additional studies, allowing an additional six estimates, where the dependent variable is a measure of occupational status rather than earnings: Bajema (1968), Conslisk (1971), Duncan (1968), Sewell, Haller and Ohlendorf (1970), and Porter(1974). The mean value of α in these studies is 0.89, and the lowest is 0.81. These results are not reported in Figure 4.

[2] These data concern the United States alone, and we do not draw any inference from them about the returns to schooling in other economies. We suspect, and there is some evidence (M. Boissiere, J. B. Knight, and R. H. Sabot, 1985, Harold Alderman, Jere Behrman, David Ross, and Richard Sabot 1996 , Paul Glewwe 1996, Victor Lavy, Jennifer Spratt, and Nathalie Leboucher 1997) that in societies where schooling is more limited in its scope, the cognitive component in the returns to schooling may be considerably larger than in the United States. However, according to Peter Moll (1995), in a sample of black workers in South Africa, the value of α for returns to primary schooling is 0.73, for secondary schooling it is 0.67, while for higher education the value is 0.92. These are well within the range of estimates presented in Figure 4.

data pertain. In a regression using categorical variables to take account of the demographic groups studied, there is no statistically significant time trend in the noncognitive component of the return to schooling. This evidence gives no support to the commonly held view that the role of measured cognitive traits in the contribution of schooling to earnings has increased over the past three decades.

These data suggest that a major portion of the effect of schooling on earnings operates in ways independent of the contribution of schooling to measured cognitive functioning. Correspondingly, the contribution of cognitive functioning to earnings is substantially independent of schooling. This being the case, it might be thought that cognitive scores might explain a substantial fraction of the residual variance in the standard earnings equation, that is one including years of schooling but not cognitive scores. But this is not the case. We have located 57 of these estimates in 24 studies. The estimated values of ΔR^2 (using in most cases 'corrected' R^2) along with the years to which the earnings data pertain appear in Figure 5. The mean value of ΔR^2 is 0.0104, the median is 0.007 and the range is -0.015 to 0.04. Regressing the estimates of ΔR^2 on the years to which they pertain, we find no time trend in its value (see Bowles, Gintis and Osborne (2002) for details).

4 Which Traits are Rewarded on the Labor Market?

If the role of cognitive performance in the determination of earnings is modest, what individual traits might account for the large unexplained variance of earnings among demographically similar individuals with the same years of schooling? Four meta-analyses of personality measures as predictors of various objective and subjective indicators of job performance (Edwin E. Ghiselli and Richard P. Barthol 1953, Robert P. Tett, Douglas N. Jackson, and Mitchell Rothstein 1991, Murray R. Barrik and Michael Mount 1991, Schmidt and Hunter 1998) suggest that some dimensions of personality, particularly those captured on what are termed integrity tests and one of the "big five" personality traits, "conscientiousness"—are strong predictors of success in occupations. In the most recent meta-analysis these two traits were found to be uncorrelated with general cognitive performance, with average normalized regression coefficients predicting job performance of 0.41 and 0.31. The many individual studies we have consulted yield highly variable results, however.

A large number of studies have indicated the importance of personality and other noncognitive traits as determinants of earnings (Andrisanni and Nestel 1976, Jencks 1979, Filer 1981, Murnane, Willett, Braatz and Duhaldeborde 1997, Goldsmith, Veum and Darity 1997, Duncan and Dunifon 1998a,Osborne 2000, Rosenbaum, DeLuca and Miller 2000).

The survey of research by Jencks (1979b) makes it quite clear that personal

traits—'industriousness,' 'perseverance,' 'leadership,' and others—self-assessed and reported by others, as well as study habits and other behavioral patterns in school, influence subsequent occupational status attainment and earnings independently of parental socioeconomic background, cognitive test scores, and years of schooling. For example, in an equation predicting hourly earnings in a large representative sample, the normalized regression coefficient on a composite measure of noncognitive traits is four times the size of the analogous coefficient for a test score, twice that of family background, and 50 per cent larger than that for years of schooling.[3]

A recent study (Greg Duncan and Rachel Dunifon, 1997) using the Panel Study of Income Dynamics (PSID) suggests robust effects of incentive-enhancing preferences. They study adult males whose motivational and behavioral traits had been measured 15 to 25 years prior to the observations of their current earnings. Among the motivational traits measured are preference for challenge over affiliation, fear of failure, sense of personal efficacy, and degree of trust. Behavioral measures included church attendance, participation in social clubs, television viewing, newspaper reading, and (as discussed in the Introduction) an interviewer's assessment of the cleanliness of the respondent's home. These variables along with a cognitive test score, a measure of years of schooling completed, and an unusually rich set of other controls were then used to predict the average of the log of hourly wages between 1988–1992. In separate regressions estimated by Duncan and Dunifon at the request of the present authors, the following results were generated. First the reduction in unexplained variance associated with the introduction of the motivational and behavioral variables (to an equation including all background controls, schooling and the cognitive score) was 0.05, a figure to be compared with the average of 0.01 for the reduction in unexplained variance associated with adding a cognitive score (in Figure 5). The introduction of the attitudinal and behavioral variables reduced the estimated coefficient on the years of schooling variable by 37 per cent, which may be compared with an average of a 18 per cent reduction in the schooling coefficient occasioned by the addition of a cognitive score (Figure 4).

In addition, another recent study (Melissa Osborne 2000) using the (U.S.) National Longitudinal Survey of Young Women (NLSYW) and the (U.K.) National Child Development Study (NCDS), finds behavioral traits to have a significant influence on the earnings of women, controlling for standard human capital variables. The Rotter locus of control is the only personality variable considered from the NLSYW. It is designed to measure the externality of an individual, or the degree to which they believe that outcomes are the result of luck or fate rather than hard work. The NLSYW collects measures of externality by using the eleven-item abbreviated Rotter scale, and measures of personal control, evaluated from four of these eleven

[3]Reported in Jencks (1979b), Table 5.8, equation 5.

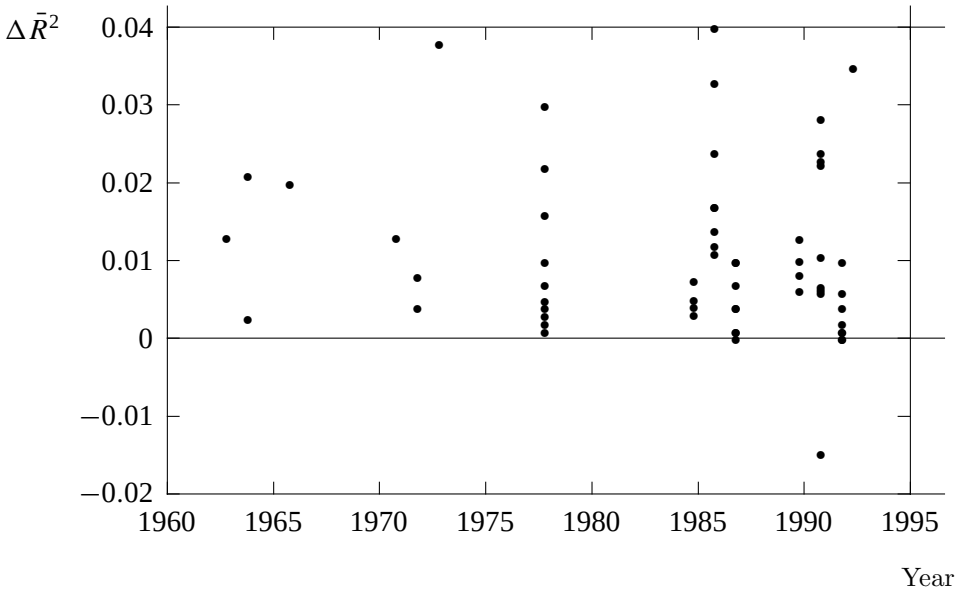

Figure 5: The Contribution of Cognitive Differences to Residual Inequality by Year: Estimates from 57 Estimates in Twenty Four Studies. $\Delta \bar{R}^2$ is the change in adjusted R^2 when a cognitive test is added to the regression.

questions, are used. From the NCDS, two orthogonal personality variables are extracted using principal components from a 146 item and 12-syndrome inventory of social adjustment evaluated when the respondents are eleven years of age. The inventory is evaluated during school by an outside investigator.

This study also addresses the two econometric issues most troubling in this literature, measurement error and the endogeneity of personality and outcome variables. Measurement error in each variable is corrected by augmenting the correlation matrix using reliability estimates from paired responses within the data set or external sources when the data does not allow. These reliability estimates allow "corrected" correlations to be used in regressions of wages on personality and human capital variables.

In addition, exogenous instruments for adult personality are developed, thereby preventing the overestimation of the coefficient on personality because of the positive covariance between personality and the error term. The first technique uses measures of personality prior to labor market experience as an exogenous instrument for adult personality and the second technique creates an instrument for adult personality that is independent of wages yet highly correlated with adult personality measures. In a regression analysis of the NLSYW, we find that there is a significant negative sign on the Rotter score, indicating that the belief that outcomes are the

result of fate or luck has a negative influence on earnings, with a one standard deviation increase in Rotter score associated with almost a seven percent decrease in wages. The coefficient is statistically significant and the results are similar to that found by Andrisanni (1978) and Duncan and Dunifon (1998a). Using the NCDS, the estimated coefficients on personality variables are statistically significant and suggest that a one percent deviation change in aggression is associated with almost an eight percent decrease in wages and a one standard deviation increase in withdrawal is associated with over a three percent decrease in wages. In addition, the increase in the total explained variance of wages from including personality (0.014) is larger than the mean increase in explained variance from including cognitive scores to wage determination models reported above.[4]

Osborne (2000) also finds evidence of sex and occupational status differences in the returns to personality. The results indicate that in high status occupations, women face significantly larger penalties than men for being aggressive while men are more heavily penalized for being withdrawn. Indeed, a one standard deviation increase in aggression is associated with a decrease in women's earnings by more than seven percent while the same change is associated with an average increase in men's earnings by almost fifteen percent. Similarly a one standard deviation increase in withdrawal is associated with a decrease in men's wages by seventeen and fifteen percent for high and low status occupations, respectively. For women, these same changes in withdrawal are associated with a six percent increase in wages for high status women and a six percent decrease in wages for women in low status occupations. Of course, just as Osborne found that specific personality traits contribute to earnings in different ways depending on the job and the sex of the individual, it may be that the traits found to be important in her study using UK data would not have the same explanatory power in the U.S. or some other country.

Thus, while the study of non-skill traits as earnings determinants is in its infancy, there is some evidence that motivational and behavioral traits are predictors of higher pay. It is impossible to know, of course whether these traits are simply proxies for (or perhaps contributors to the acquisition of) unmeasured skills or are valued as such by employers.

5 Cultural Evolution and the Correspondence Principle

The Correspondence Principle, which constituted the centerpiece of our analysis of the way schools produce future workers, may seem to be based on the notion that schools *socialize* students to accept beliefs, values, and forms of behavior on the basis of authority rather than the students' own critical judgement of their interests.

[4] See Osborne (2000) and Bowles et al. (2002) for details.

Socialization theory, however, has been broadly criticized for two reasons. First, it treats the process of adopting and rejecting new behaviors as a black box. It does not explain how individuals learn what. Second, many variants of socialization theory appear to place the individual in an entirely passive role, a mere receptacle of the content of socialization rather than an active participant in the process. For this reason socialization theory appears incompatible with widely accepted notions of human agency that stress our rationality, intelligence, and capacity to make choices informed by knowledge of the consequences of such choices for achieving goals. In particular, if socialization theory were correct, social movements that question dominant institutions (for instance the women's, anti-war, and civil rights movements that were strong when *Schooling in Capitalist America* was written) could not occur at all.We were certainly aware of this critique when we wrote and indeed Gintis (1975) made exactly this point in an interchange with the sociologist Talcott Parsons. We have since devoted considerable research effort towards developing an adequate theory of culture and cultural change, and we will sketch here how the Correspondence Principle might be fleshed out without assuming the "oversocialized" conception of the individual inherent in socialization theory (Wrong 1961).

Our reformulation embodies two basic principles. First, schools influence which cultural models children are exposed to. Second schools immerse children in a structure of rewards and sanctions. Concerning the first, we note that a huge body of evidence attests to the fact that a society's values are passed from generation to generation through a process of transmission which may be *vertical* (from parents) or *oblique* (from others in the prior generation) and involves a psychological *internalization of values* (Cavalli-Sforza and Feldman 1981, Cavalli-Sforza and Feldman 1982, Chen, Cavalli-Sforza and Feldman 1982, Boyd and Richerson 1985, Grusec and Kuczynski 1997). The school system is an unusual form of oblique transmission whereby a particular group of people that is often quite unrepresentative of the population of parents (teachers) occupy privileged positions as behavioral models for children (Marx (1963/1852):125). Concerning the second principle—the rewards and sanctions involved in the socialization process—we model individuals as at times treating culture more instrumentally—as a set of social practices that may be adopted, abandoned, and transformed in organizing social interactions (Gintis 1980, Bowles and Gintis 1986). The rewards and sanctions associated with particular behaviors in the school setting are part of this process. Gellner (1985) noted the central role of specialized personnel as the key feature of modern systems of cultural transmission (which he termed *exo-socialization* because of the important part played by outsiders rather than parents and neighbors in the process). Marx, in a passage we quoted in *Schooling in Capitalist America*, depicted the process of cultural modernization as a conflict between two competing forms of oblique transmission: "ldots the modern and the traditional consciousness of the (early

19th century) French peasant contended for mastery (in)…the form of an incessant struggle between the schoolmasters and the priests."

A simple model of this process is the following. Children initially acquire cultural traits by vertical transmission from their parents (assume the parents have identical traits) They are subsequently paired with a cultural model (a teacher, that is) who may have the same or a different array of cultural traits. Confining attention to a single trait, suppose the teacher has the same trait as the parents. Then the youth is assumed to retain the trait. But if the parents and the teacher have different traits, the youth considers which one to adopt, surveying the experiences of those he knows (his classmates) for guidance in making the switch. Among the experiences the youth may find salient are the rewards and punishments associated with the particular structure of schooling. The reward structure underlying the workings of the correspondence principle includes the close association, documented in *Schooling in Capitalist America*, between the personality and behavioral traits associated with getting good grades in school and the traits associated with garnering high supervisor rankings at work.

In this view, culture thus evolves by some individuals (those paired with an un-like model) shifting from what they take to be lower to higher-payoff cultural forms. The formal analysis of this process is presented in Bowles (2001). Gintis (2001b), and Gintis (2001a), based on the technique of evolutionary modeling called *replicator dynamics*. In this model, it is possible for a school system or any other system of socialization to promote the spread of a cultural trait that would otherwise not proliferate, suggesting that schools do more than simply reproduce the reward structure of the rest of the society. Schooling thus may promote prosocial traits even if these are not individually advantageous. By like reasoning, schooling can also promote traits which are advantageous to one group (the group determining the structure of schooling) even if they are not generally advantageous.

To see this, consider a group whose members can adopt either cultural trait A or cultural trait B. Trait B is superior in the sense that B-types have payoff 1, as compared with trait A, whose users have payoff $1-s$, where $0 < s < 1$. We assume that during childhood A-types and B-types (those who have provisionally received these traits via vertical transmission from their parents) are paired with a cultural model (teacher) who may be of either type. As above those paired with a like type retain their type. Those who are paired with an unlike type then may switch their type, and the likelihood of their doing so is increasing in the difference in the difference in net rewards which the individual observes.

Oblique transmission, as we have seen, is structured in a particular way in a modern school system: teachers are the major cultural models, more than neighbor elders, religious figures, and the like, and the rewards and penalties driving the updating process are structured by such things as the correspondence between the

personality traits associated with good grades and employer approval. We now believe that we may have overemphasized the rewards associated with future work roles rather than future roles as citizens, family members, and the like, but this does not bear on the logic of the model. Schooling can affect the direction of cultural evolution in two ways. First, if most teachers are A's then the children of A parents will rarely switch, while B-children will virtually all have the occasion (a mismatch) to consider a switch. Second, if the reward structure of the school favors those with A-traits (even if the B's might do better in adult life) then a significant number of B-children will become A's.

For full developments of this and related models, see Bowles (2001). Gintis (2001b), and Gintis (2001a). Here we present only a few major implications. First, in the absence of oblique transmission of the disadvantaged cultural form, the advantaged cultural form always drives out disadvantaged. Second, when oblique transmission of the disadvantaged trait is present, a positive frequency of this trait can persist even when some fraction of agents are switching to the advantaged form to increase their payoffs. Depending on the specific assumptions of the model and the specific value of parameters, there can either be two stable "homogeneous" cultural equilibria involving very high frequencies of either the advantaged or disadvantaged trait, or a single stable "heterogeneous" equilibrium involving a moderate frequency of both cultural forms.

These propositions show the importance of such oblique cultural institutions as schools, which are necessary to stabilize cultural forms, such as the legitimacy of being subservient in the workplace, that benefit one group, in this case employers, at the expense of another, the employees. In light of this result, our analysis of the capital-labor conflicts of the content and form of schooling become understandable without recourse to the theory of socialization as presented in standard sociology.

6 Conclusion

The main scientific findings of *Schooling in Capitalist America* have remained plausible and their validity has even been strengthened over the past quarter century. We believe that the Correspondence Principle is also by and large correct.

Over the years *Schooling in Capitalist America* has received a considerable amount of critical attention for which we are grateful. One reading of our book—that it presented a functionalist argument—is sufficiently misguided to deserve brief comment here. A functionalist argument explains something, such as the structure of schooling, by the benefits it confers on some group, for instance the profits accruing to employers from a well-socialized labor force, without providing any causal explanation of the manner in which these consequences account for the thing

to be explained. We devoted three chapters of *Schooling in Capitalist America* to the history and evolution of education precisely to illuminate the process by which the Correspondence Principle and other aspects the structure of schooling came about. The benefits (correctly) anticipated by employers loom large in this account. But this does not make the argument functionalist. We suspect that some readers were surprised that overt class conflict over the content and structure of schooling played such a minor role in our account of the history of U.S. education, but we did not then, nor do we now, believe that the historical record supports this more traditional Marxian interpretation. Our dissatisfaction with *Schooling in Capitalist America* in this respect is not that we downplayed class conflict, or that we failed to provide a causal mechanism, but we may have misunderstood the causal mechanism. Our interpretation gave insufficient attention to the contradictory pressures operating on schools, particularly those that emanate on the one hand from the labor market, which we stressed, and the democratic polity, which we should have emphasized more. We present a more adequate view in Bowles and Gintis (1981) and in *Democracy and Capitalism* (1986).

The main shortcomings of *Schooling in Capitalist America* reflect the times in which we wrote. The long 1960's economic boom and the anti-materialist counter-cultural currents that it fostered perhaps led us to underemphasize the value of schooling in contributing to productive employment. The more important shortcoming, we think, is programmatic. We avoided for the most part the question of what schools *should* be, focusing instead on what schools actually are and do. We also neglected to devote much attention to how economic systems other than capitalism might better facilitate achieving the enlightened objectives of schooling. We took it as obvious that a system of democratic, employee-owned enterprises, coordinated by both markets and governmental policies, was both politically and economically viable as an alternative to capitalism. We remain convinced of the attractiveness of such a system, but are less sanguine about its feasibility, and more convinced that reforms of capitalism may be the most likely way to pursue the objectives that we embraced at the outset. While the book endorses the idea that radicals–even revolutionaries–must also be reformers, we provided little guidance to either policy makers, teachers, or students seeking practical positive steps to bring about long term improvements in educational structure and practice.

Partly because we are now reasonably certain that we had the facts right, we remain committed to our overall approach to schooling—embedding the analysis of education in the evolving structure of the economy and the polity, and giving attention to the non-cognitive as well as cognitive effects of education. Today, no less than during the stormy days when *Schooling* was written, schools express the conflicts and limitations as well as the hopes of a heterogeneous and unequal society. Schools continue to be both testing grounds and battlegrounds for building a society

that extends its freedoms and material benefits to all.

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