Schooling in Capitalist America Revisited

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Recent research has entirely vindicated the authors' once-controversial estimates of high levels of intergenerational persistence of economic status, the unimportance of the heritability of IQ in this process, and the fact that the contribution of schooling to cognitive development plays little part in explaining why those with more schooling have higher earnings. Additional research has supported the authors' hypotheses concerning the role of personality traits, rather than skills, per se, as determinants of labor market success. Recent contributions to the study of cultural evolution allow the authors to be considerably more specific about how behaviors are learned in school.

The project that eventually resulted in the publication of *Schooling in Capitalist America* (Bowles and Gintis 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, the 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. The system's 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 be explained only partly 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 goal 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 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 United States 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, and we devoted a chapter to what we termed the contradictions of higher education. Later, in *Democracy and Capitalism* (Bowles and Gintis 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 that are quite removed from the questions we addressed in that book. 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 1970s has entirely vindicated our once-controversial estimates of high levels of intergenerational persistence of economic status (see the first section), the unimportance of the heritability of IQ in this process (see the second section), 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 the third section). Some additional research has supported our hypotheses concerning the role of personality traits, rather than skills per se, as determinants of success in the labor market (see the fourth section). But progress has been halting in this area. We survey some of this recent research in recent and forthcoming articles (Bowles and Gintis forthcoming a, forthcoming b; Bowles, Gintis, and Osborne 2001, forthcoming). In the fifth section, 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. Contributions to the study of cultural evolution (Bowles and Gintis 1986; Boyd and Richerson 1985, Cavalli-Sforza and Feldman 1981) allow us to be considerably more specific about how behaviors are learned in school.

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 20 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 men, "[a]lmost all earnings advantages and disadvantages of ancestors are wiped out in three generations" (p. S32). Indeed, Becker (1988:10) expressed a widely held consensus when, in his presidential address to the American Economics Association, he concluded that "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 U.S. studies surveyed by Becker and Tomes (1986). The intergenerational correlations surveyed by Mulligan (1997) for family consumption, wealth, income, and earnings average, respectively, 0.68, 0.50, 0.43, and 0.34. The upward adjustment of the consensus estimates of the extent of intergenerational inequality has stimulated a revival of empirical research on the mechanisms that account for parent-offspring similarity in economic status (see Behrman, Pollak, and Taubman 1995; Mulligan 1997).

Thus, *Schooling in Capitalist America* was correct: The extent of intergenerational 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 knowing the person's 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, the mean income in the second generation, and an error term.

$$y = (1 - ß_y)\bar{y} + ß_y y_p + \epsilon_y. \quad (1)$$

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, $ß_y$ is a constant, y_p is the individual's parental y, and e_y is a disturbance uncorrelated with y_p. Rearranging terms, we see that

$$y - \bar{y} = ß_y (y_p - \bar{y}) + \epsilon_y \quad (2)$$

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

$$r_y = ß_y \frac{s_{yp}}{s_y}$$

where s_y is the standard deviation of y. We measure economic success using natural logarithms, $ß_y$ is the percentage change in offspring's economic success associated with a 1 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.

Table 1. Intergenerational Persistence of Some Economic Characteristics (Galton Coefficient)

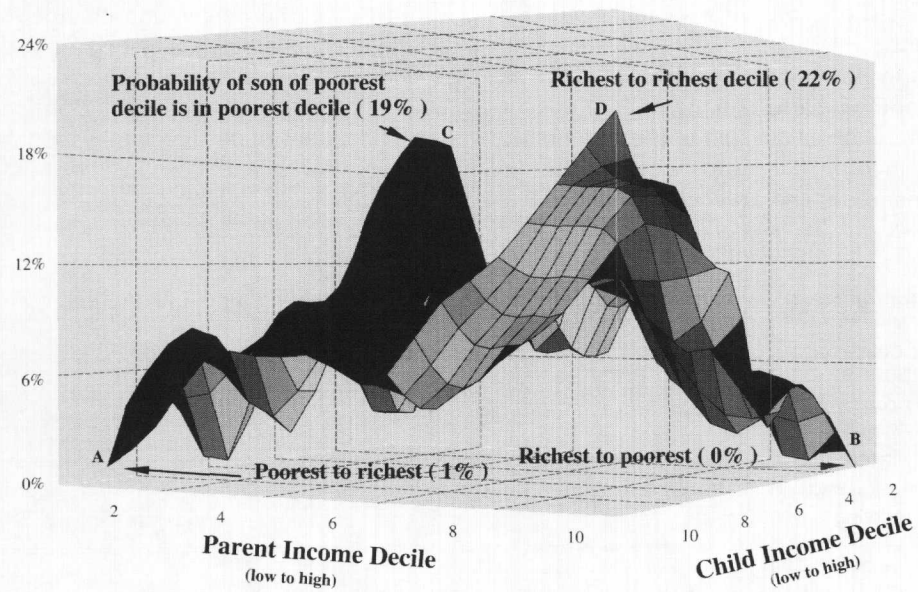
Economic Characteristic	Number of Estimates	Range	Average
Log family consumption	2	0.59–0.77	0.68
Log family wealth	9	0.27–0.76	0.50
Log family income	10	0.14–0.65	0.43[a]
Log earnings or wages	16	0.11–0.59	0.34[a]
Years of schooling	8	0.14–0.45	0.29[a]

Source: Mulligan (1999).

[a]If recent studies of the United States only are included, these averages are 0.35, 0.33, and 0.38, respectively.

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, 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 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 in cell *(i,j)* is the probability that an adult (aged 30 or over) whose parents are in the *i*th decile of income will have an income in the *j*th decile. The income of sons was averaged of the years 1984–93, and the parents' income was average over the years 1975–93. 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 0.16. 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 of attaining the top decile, while Point B indicates that for the son of the poorest decile, the likelihood is 1 in 100. Point C indicates that sons of the poorest decile have a 19 percent probability of attaining the lowest decile. Hertz's transmission matrix and other studies (Cooper, Durlauf, and Johnson 1994; Corak and Heisz 1999; 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 vulnerability to violence or other adverse health episodes may be more important at the bottom.

Figure 1. Intergenerational Income Transition Probabilities. Source: Hertz (2001b), which includes the *10* transition matrix.



INTERGENERATIONAL STATUS TRANSMISSION

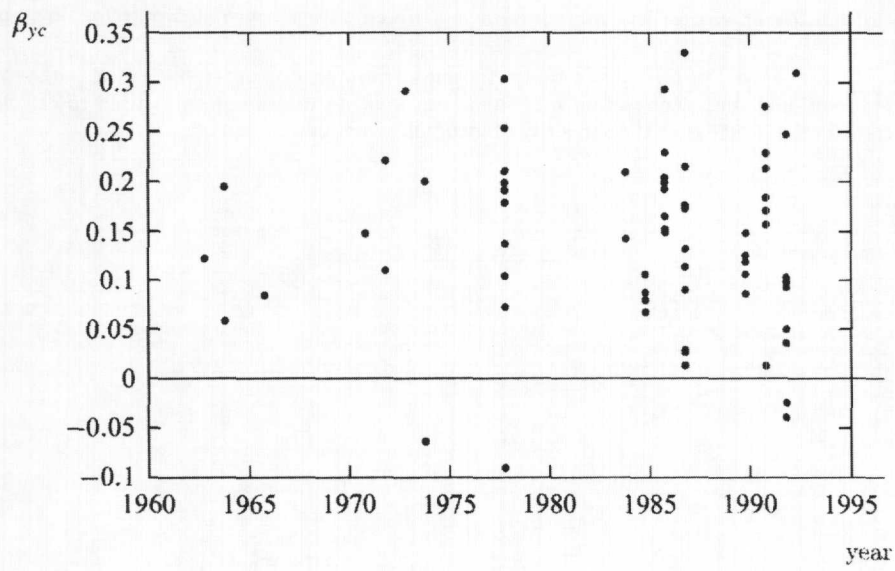
What accounts for the transmission of economic status from parents to offspring? There are only a few income-generating traits for which both economic relevance and similarity of parents and offspring have been empirically demonstrated. Among them are cognitive performance, the level of schooling, and ownership of assets. Our estimates (Bowles and Gintis forthcoming b) 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 the transmission of IQ 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 versus 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.

We located 65 estimates of the normalized regression coefficient of a test score in an earnings equation for the United States over three decades. These estimates 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

Figure 2. Normalized Regression Coefficient of Cognitive Score on the Logarithm of Income or Earnings by Year: 65 Estimates from 24 Studies. Source: Bowles et al. (forthcoming).



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 cognitive skill is becoming an increasingly important determinant of economic success.

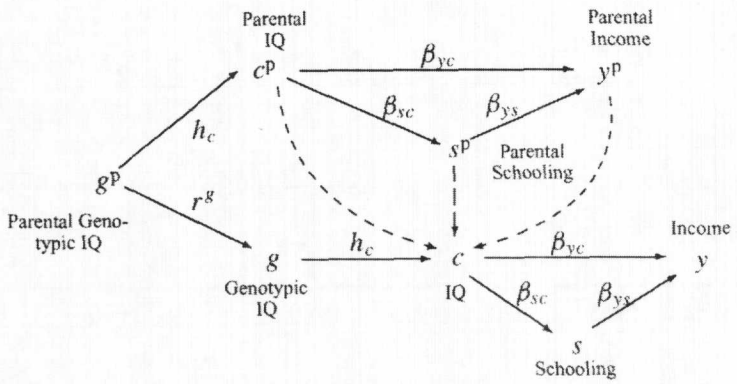
We investigated the sensitivity of the results just reported to a number of possible sources of error. First, we tested for effects of the age at which the test was taken and especially whether the respondent had completed schooling at the time. For about two-thirds of the estimates, we were able to determine if the test was taken before or after school was completed. For these estimates, there is no effect of the timing of the test on the measures reported earlier. Second, we investigated the importance of the type of test used and found that studies that used more comprehensive tests generally performed somewhat less well than did those that used 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 10 percent larger than the narrower tests.

What do these results imply about 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 was no genetic inheritance of IQ, that is, if the correlation of parental and child genotypic IQ was zero. Inspecting the causal model in Figure 3, one can see that it involves severing the genetic link (r^g) and then calculating the implied hypothetical correlation between parents' earnings and offsprings' earnings. The difference between this hypothetical calculation and the observed correlation is the genetic contribution *via* IQ to the intergenerational transmission of economic 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 parents' and offsprings' 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, and the others as dashed arrows. We used representative estimates from the literature (most of them summarized in Bowles et

Figure 3. A Causal Model of Intergenerational Earnings Transmission. Note: The causal paths generate the intergenerational status correlation r_{ypy}. Solid lines indicate the causal paths used to calculate the genetic contribution (*via* IQ) to the similarity of incomes across generations.



al. forthcoming; see Bowles and Gintis forthcoming b 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's incomes as a maximum of 0.035, assuming that IQ is perfectly heritable, or 0.018 making the more widely accepted assumption that about half the variation 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 mountainous terrain it actually resembles. The likelihood that a child of the richest decile would attain the top income decile would exceed that of the poor by 12 *percent,* assuming IQ to be 50 heritable, rather than by the 16–44 *times* observed in Figure 1.

HOW SCHOOLING AFFECTS LABOR MARKET SUCCESS

Individuals possess a vector of personal capabilities, c, and sell these capabilities 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 that 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. The following are three examples of the importance of noncognitive traits that are important for success in the labor market. The first is from a recent survey of 3,000 employers conducted by the U.S Bureau of the Census (1998), in collaboration with the Department of Education, 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" (ranked 4.2).

The second example is from the far-more-detailed Employers' Manpower and Skills Practices Survey of 1,693 British employers reported in Green, Machin, and Wilkenson (1998). Of the somewhat more than a third of the establishments that reported a "skill shortage," personnel managers identified the recruitment problem as the "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 given for the recruitment difficulty. The importance of motivation relative to technical skill was even greater among the full sample.

The third example is from a series of studies (Cameron and Heckman 1993; Heckman forthcoming; Heckman, Hsee, and Rubinstein 1999) on the labor market impact of the GED (general equivalency diploma), a diploma gained by a test of cognitive skills taken by a large fraction of dropouts from U.S. 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 wages of GED holders are barely higher than those of other, less cognitively skilled dropouts and are perhaps 10 percent below the levels that would be predicted on the basis of their cognitive skills and other conventional determinants of earnings. Heckman and his coauthors reasoned 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 to schooling depend on "seat time"; that is, being there may be more important than learning the new 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 "socialization for work" (Dreeben 1967; Parsons 1959). 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 modern labor economics, which recognizes that the employment relationship is generally contractually incomplete and hence that an employee's effort (and hence the delivery of productive services to the employer) depends on how the employee responds 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—raises the importance to the employee of retaining the job in the future and thus of avoiding any behavior that may 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. The 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

$$y = ß_s s + ß_b b + ß_c c + \epsilon, \tag{3}$$

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

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

with ϵ' representing the stochastic influences stated earlier, 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 Equation 3, in which a measure of cognitive skill also appears ($ß_s$) and another like Equation 4, in which the cognitive measure is absent ($ß'_s$). The ratio of the first to the second, which we write as

$$\alpha = \frac{ß_s}{ß'_s} \tag{5}$$

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 "noncognitive component of the returns to schooling."

If schooling affected earnings solely through its contribution to cognitive capacities (assuming these capacities 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 con-

trast, 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 the authors). The most obvious potential problem—that the cognitive score may be measured with considerably more error than the schooling variable and hence that α is biased upward—is almost certainly not the case.

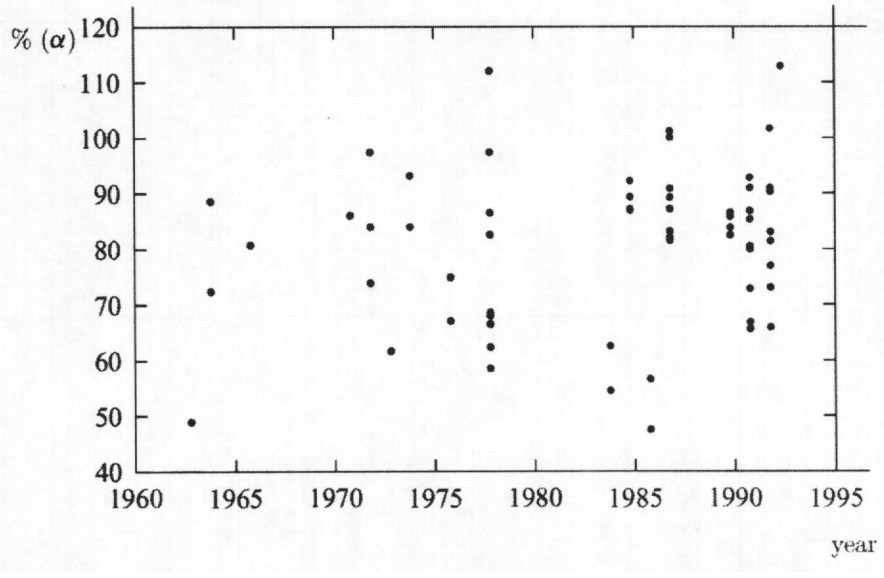
For the United States from the late 1950s to the early 1990s, we were able to locate 25 studies, allowing 58 estimates of the relationship between $ß_s$ and $ß'_s$ and thus an estimate of α. The data sources underlying this and the other figures in this article are described in Appendix 1 (available from the authors). Methods of estimation differ, of course, and the demographic groups covered and the years for which the data apply vary considerably. We 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 percent. The median for α was 0.84, and the range was 0.48 to 1.13. This finding suggests that a substantial portion of the returns to schooling are generated by effects or correlates of schooling that are substantially unrelated to the cognitive capacities measured on the available tests.[2]

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

Figure 4. The Noncognitive Component Fraction, α, of the Private Return to Schooling over Time: A Summary of 58 Estimates from 25 Studies



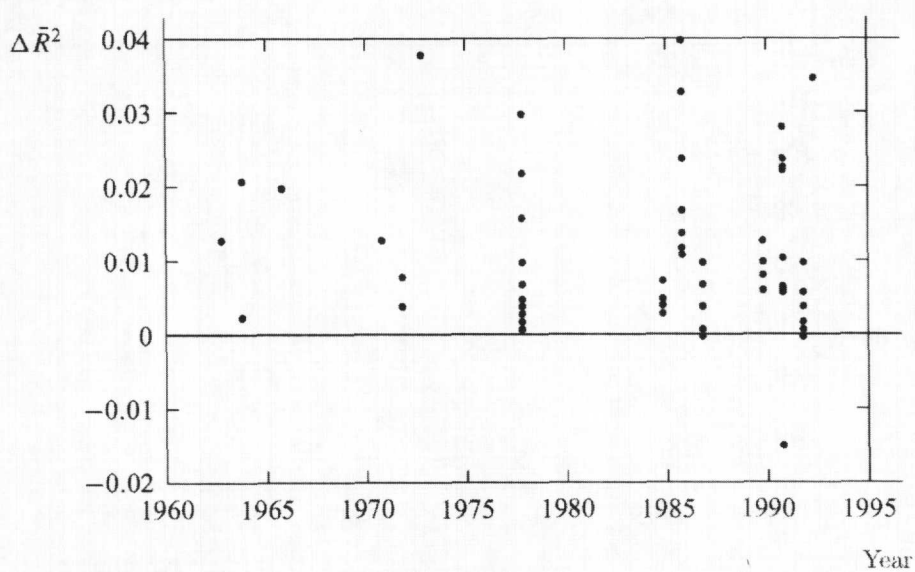
independent of schooling. This being the case, it may be thought that cognitive scores may explain a substantial fraction of the residual variance in the standard earnings equation, that is, one including years of schooling but not cognitive scores. But this is not the case. We located 57 of these estimates in 24 studies. The estimated values of ΔR^2 (using, in most cases, "corrected" R^2) and 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 et al., forthcoming, for details).

WHICH TRAITS ARE REWARDED IN THE LABOR MARKET?

If the role of cognitive performance in the determination of earnings is modest, what individual traits may 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 (Barrick and Mount 1991; Ghiselli and Barthol 1953; Schmidt and Hunter 1998; Tett, Jackson, and Rothstein 1991) suggested 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 (Schmidt and Hunter 1998), these two traits were found to be uncorrelated with general cognitive performance, with average normalized regression coefficients of 0.41 and 0.31 predicting job performance. The many individual studies we consulted yielded 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; G. J. Duncan and Dunifon 1998a; Filer 1981; Goldsmith, Veum, and Darity 1997; Jencks 1979; Murnane et al. 1997; Osborne 2000; Rosenbaum, DeLuca, and Miller 2000). Jencks's (1979) survey of research made it quite clear that personal traits—industriousness, perseverance, leadership, and others—self-assessed and reported by others, as well

Figure 5. Contribution of Cognitive Differences to Residual Inequality by Year: Estimates from 57 Estimates in 24 Studies. ΔR^2 is the change in adjusted R^2 when a cognitive test is added to the regression.



as study habits and other behavioral patterns in school, influence subsequent occupational status attainment and earnings independently of parental socioeconomic background, scores on cognitive tests, 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 percent larger than that for years of schooling (reported in Jencks 1979, Table 5.8, Equation 5).

G. J. Duncan and Dunifon's (1998a, 1998b) study, using the Panel Study of Income Dynamics, suggested that the effects of incentive-enhancing preferences are robust. These researchers studied men 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 were preference for challenge over affiliation, fear of failure, sense of personal efficacy, and degree of trust. The 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 score on a cognitive test, 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 and 1992.

In separate regressions estimated by Duncan and Dunifon at our request, the following results were generated. First, the reduction in the 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 the 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 percent, which may be compared with an average of a 18 percent reduction in the schooling coefficient occasioned by the addition of a cognitive score (see Figure 4).

In addition, Osborne (2000) using the (U.S.) National Longitudinal Survey of Young Women (NLSYW) and the (U.K.) National Child Development Study (NCDS), found that behavioral traits have a significant influence on the earnings of women, controlling for standard human capital variables. The Rotter locus of control was the only personality variable considered from the NLSYW. It was designed to measure the externality of an individual, or the degree to which the individual believes that outcomes are the result of luck or fate, rather than hard work. The NLSYW collects measures of externality by using the 11-item abbreviated Rotter scale, and Osborne used measures of personal control, evaluated from 4 of these 11 questions. From the NCDS, Osborne extracted two orthogonal personality variables using principal components from a 146-item and 12-syndrome inventory of social adjustment evaluated when the respondents were aged 11. The inventory was evaluated during school by an outside investigator.

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

In addition, Osborne used exogenous instruments for adult personality, 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 found that there is a significant negative sign on the Rotter score, indi-

cating that the belief that outcomes are the result of fate or luck has a negative influence on earnings, with a 1 standard deviation increase in the Rotter score associated with an almost 7 percent decrease in wages. The coefficient is statistically significant, and the results are similar to that found by Andrisanni (1978) and G. J. Duncan and Dunifon (1998a). Using the NCDS, we found that the estimated coefficients on personality variables are statistically significant and suggest that a 1 percent deviation change in aggression is associated with an almost 8 percent decrease in wages, and a 1 standard deviation increase in withdrawal is associated with more than a 3 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 the explained variance from including cognitive scores in wage determination models reported earlier (for details, see Bowles et al. forthcoming; Osborne 2000).

Osborne (2000) also found 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 do men for being aggressive, while men are more heavily penalized for being withdrawn. Indeed, a 1 standard deviation increase in aggression is associated with a decrease in women's earnings by more than 7 percent, while the same change is associated with an average increase in men's earnings by almost 25 percent. Similarly, a 1 standard deviation increase in withdrawal is associated with a decrease in men's wages by 17 percent and 15 percent for high- and low-status occupations, respectively. For women, these same changes in withdrawal are associated with a 6 percent increase in wages for high-status women and a 6 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 British data would not have the same explanatory power in the United States or some other country.

Thus, while the study of nonskill traits as determinants of earnings 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.

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 judgments of their interests. 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 to be incompatible with widely accepted notions of human agency that stress our rationality, intelligence, and capacity to make choices that are 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, antiwar, 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 the book and, indeed, Gintis (1975) made exactly this point in an interchange with the sociologist Talcott Parsons. We have since devoted considerable research effort toward developing an adequate theory of culture and cultural change, and we sketch here how the correspondence principle may be fleshed out without assuming the "oversocial-

ized" conception of the individual that is 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 that may be *vertical* (from parents) or *oblique* (from others in the prior generation) and involves a psychological *internalization of values* (Boyd and Richerson 1985; Cavalli-Sforza and Feldman 1981, 1982; Chen, Cavalli-Sforza, and Feldman 1982; Grusec and Kuczynski 1997). The school system is an unusual form of oblique transmission whereby a particular group of people who are often unrepresentative of the population of parents (teachers) occupy privileged positions as behavioral models for children (Marx 1852/1963:125).

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 (Bowles and Gintis 1986; Gintis 1980). 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: "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 (assuming that 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 unlike 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) and Gintis (2001a, 2001b) on the basis of 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 may thus promote prosocial traits even if these traits are not individually advantageous. By like reasoning, schooling can also promote traits that are advantageous to one group (the group determining the structure of schooling) even if they are not generally advantageous.

To see the validity of this assertion, 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, 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 we mentioned earlier, 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 increases with the difference in net rewards that the individual observes.

Oblique transmission, as we have noted, 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 that drive the updating process are structured by such things as the correspondence between the personality traits associated with good grades and employers' 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 bias 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 As, 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 Bs may do better in adult life), then a significant number of B children will become As.

For full developments of this and related models, see Bowles (2001) and Gintis (2001a, 2001b). Here, we present only a few major implications. First, in the absence of the oblique transmission of the disadvantaged cultural form, the advantaged cultural form always drives out the disadvantaged form. 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 the parameters, there can either be two stable "homogeneous" cultural equilibria involving 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, the 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 is understandable without recourse to the theory of socialization as presented in standard sociology.

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 a 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 of 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 that we may have misunderstood the causal mechanism. Our interpretation gave insufficient attention to the contradictory pressures operating on schools, particularly those that emanate from the labor market, which we stressed, and from the democratic polity, which we should have emphasized more. We present a more adequate view in Bowles and Gintis (1981, 1986).

The main shortcomings of *Schooling in Capitalist America* reflect the times in which we wrote. The long 1960s economic boom and the antimaterialist countercultural 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 may better facilitate the achievement of 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. Although the book endorses the idea that radicals—even revolutionaries—must also be reformers, we provided little guidance to policy makers, teachers, or students who are 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 noncognitive as well as cognitive effects of education. Today, no less than during the stormy days when *Schooling in Capitalist America* 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.

NOTES

1. We located five additional studies, allowing an additional six estimates, in which the dependent variable is a measure of occupational status rather than earnings: Bajema (1968), Conlisk (1971), O. D. Duncan (1968), Porter (1974), and Sewell, Haller, and Ohlendorf (1970). 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 only the United States, and we do not draw any inference from them about the returns to schooling in other economies. We suspect, and there is some evidence (Alderman et al. 1996; Boissière, Knight, and Sabot 1985; Glewwe 1996; Lavy, Spratt, and 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 Moll (1998), in a sample of black workers in South Africa, the value of α for returns to primary schooling is 0.73; for secondary schooling, 0.67; and for higher education, 0.92. These values are well within the range of estimates presented in Figure 4.

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