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Donald J. Treiman
Harry B. G. Ganzeboom
Susanne Rijken

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Donald J. Treiman*
University of California at Los Angeles

Harry B. G. Ganzeboom**
Utrecht University

Susanne Rijken**
Utrecht University

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*Department of Sociology 155103
UCLA
Los Angeles CA 90095
USA
Email: treiman@dudley.sscnet.ucla.edu

**Department of Sociology
Utrecht University
Heidelberglaan 2
3485 CS Utrecht
NETHERLANDS
Email: ganzeboo@cc.ruu.nl
s.rijken@fsw.ruu.nl

Abstract

We carry out an analysis of societal variations in the process of educational attainment using a multilevel modeling strategy to assess how societal modernization, educational expansion, educational inequality, a world-wide secular trend toward greater equality of opportunity, and communist educational policies affect the dependence of educational attainment on parental status and the gender gap in educational attainment. Using data from 31 societies we define five-year school cohorts ranging from 1890-94 to 1980-84, and carry out our analysis based on the 304 "contexts" (created by crossing cohort by country) for which we have adequate data. We develop arguments as to why educational reproduction should be reduced by educational expansion but reinforced by educational inequality and as to why the level of education should increase and the gender gap diminish with societal modernization and over time, and we pose several claims regarding the impact of communism on equality of educational opportunity. Our hypotheses are generally confirmed.

Introduction

It is by now a commonplace that education is the primary locus of vocational training in the modern world and, as a consequence, the primary engine of social mobility. Most people prepare for their life's work by going to school, and those who go furthest in school obtain the best jobs–those with the greatest prestige and the highest earnings. Success in school is thus the best way to overcome the limitations of one's social origins; and failure in school among the children of the advantaged is a fairly sure route to downward mobility. This has not always been so. Until quite recently in human history, most men followed their fathers into the fields and shops, learning their trade through direct apprenticeship; and most women did the same, learning the skills of household management step-by-step under their mothers' tutelage.

Although schools as separate social institutions are an ancient invention, universal public education is very new–at most a century and a half old and in most nations of the world far more recent. But as work shifted out of the fields and into the factories and as processes of production and management became more complex, the efficiency of organized schooling came to be widely understood and valued. As a consequence, education has expanded in virtually every nation on the globe throughout the 20th century, albeit more rapidly and more continuously in some societies than in others. At the turn of the century, it was uncommon for as much as 10 per cent of the male population, and an even smaller percentage of the female population, to have any secondary schooling, and large fractions had no schooling at all. By the end of the century, primary schooling has become virtually universal and a majority of children have at least some secondary education in all industrialized and many non-industrialized nations.

The claim has been advanced (e.g., Treiman 1970) that as the availability of education expanded, equality of educational opportunity concomitantly increased so that over time the educational system has come to play a central role in promoting social mobility, both upward and downward–providing opportunities to the bright and hardworking children of those of humble origins but at the same time preventing the lazy, dull, or troubled children of advantage from enjoying the fruits of their parents' success.

However, there is a competing claim. Some (e.g., Collins 1971, Bowles and Gintis 1976) see education, particularly higher education, as a vehicle for social reproduction. While it is acknowledged that equality of educational opportunity may be increasing at low levels of education, access to universities and other elite institutions is seen as monopolized by the rich and powerful. Thus, the claim is that the effect of social origins on educational attainment is greatest at the high end of the educational distribution. From this, it follows that, *ceteris paribus*, as education expands the dependence of education on social origins should increase. (See Blossfeld and Shavit, 1993:6-10, for further discussion of these claims.)

The empirical evidence in support of these competing claims is mixed. Most studies of educational expansion have been limited to single countries, although there now is an accumulation of semi-comparable studies for a fairly large number of nations, mainly though the efforts of Shavit and Blossfeld (1993), who organized parallel analyses in 13 countries. In a summary of these 13 studies, Blossfeld and Shavit (1993) report that the average level of education attained increased over time in all 13 countries (Table 1.1) but changes in the effect of social origins were quite varied: the effect of father's education declined in five nations, remained essentially unchanged in seven nations, and first declined and then increased in Czechoslovakia. The effect of father's occupational

status was even more varied–declining in three nations, remaining essentially unchanged in nine nations, and increasing in one nation, Italy (Table 1.2). They also report that, as predicted by Mare (1980:298-299), the effect of social origins declines with successively higher transitions in 12 of the 13 nations (Switzerland alone showing an inconsistent pattern).

In a previous study (Ganzeboom and Treiman 1993) we analyzed 29 nations and found results generally similar to those reported by Blossfeld and Shavit: education expanded over time in all countries; for the 26 nations for which both father's education and father's occupational status were available, the effect of father's education declined significantly over time in nine nations, remained essentially unchanged in 15 nations, and significantly increased in two nations, while the effect of father's occupational status declined significantly in five nations, remained essentially unchanged in 20 nations, and increased in one nation.

However, in our earlier paper we suggested that an analysis of temporal change in educational reproduction is inadequate, since the extent of reproduction turns not only on the extent of educational expansion but also on the extent of educational inequality. We showed that in general, educational expansion reduces the effect of social origins on educational attainment while educational inequality increases the effect of social origins, both over time within nations and across nations for specific points in time. We suggest that analyses of societal variations in the process of educational attainment must consider the range of factors that are operative in the particular context in which educational decisions are made. The present paper takes a step in the direction of such an expanded analysis, reconsidering the same issues as our 1993 paper with data for more nations, the inclusion of women as well as men, consideration of a richer set of hypotheses with a larger set of

macro-variables, and an alternative statistical technology (multilevel analysis); a future paper will consider educational transition ratios.

Hypotheses Regarding Educational Attainment

In the present paper our primary interest is in how the process of educational attainment varies across different social contexts, where contexts are defined by the social structure of nations at specific points in time. We first propose a simple model of the factors affecting status attainment in all contexts (that is, a model that we claim holds for all societies throughout at least the past century); this is our micro-model. We then consider how variations in social structure across societies and over time might be expected to modify the expectations of our micro-model; this is our macro-model.

Micro-level hypotheses

Here our expectations are straightforward and unproblematic: those from more advantaged social origins (measured by father's education and father's occupational status) should obtain more schooling; and men should obtain more schooling than women.

There are two reasons for expecting a positive effect of social origins on educational attainment. The most important is the role of family cultural capital as an intervening mechanism. Well-educated parents provide home environments that generate the skills, expectations, and motivations that lead children to do well in school and to wish to continue in school (Bourdieu and Passeron 1977). The same is true of parents with high status jobs, since such jobs are cognitively demanding (Kohn and Schooler 1983). Second, high status jobs tend to pay well, and hence to

provide the material resources that make it possible to pay school fees and to forgo the need for children to leave school in order to help support themselves or their families. In sum, those from high status families tend to enjoy superior cultural and material resources that both encourage and facilitate extended education.

Our expectation that men will obtain more education than will women of comparable social origin status is based on the assumption that families will act rationally in light of the universal propensity for men to get higher returns to education than women (e.g., Treiman and Roos 1983). If a choice needs to be made between educating one's sons or one's daughters, the rational choice–from the point of view of providing for one's own social security–is to give preference to the education of sons. This suggests that in societies with public social security systems, the difference in the educational attainment of men and women should be minimized, a point we will return to below.

Macro-level hypotheses

We next consider whether and in what ways the process of status attainment might be expected to vary in different social environments, that is, whether there is reason to expect systematic variation across contexts in the magnitude of the four coefficients of the micro-model. We consider the effects of five contextual variables (educational expansion, educational inequality, the level of societal modernization, communism, and cohort). **Educational expansion** refers to the average level of education in a society at a particular point in time. **Educational inequality** refers to the variability in educational attainment in a society at a particular point in time. **Modernization** refers to the level of societal modernization, and is measured by the proportion of the labor force

engaged neither in agriculture nor in traditional sales occupations. **Communism** is a dichotomous variable distinguishing communist from non-communist regimes. **Cohort** defines the temporal context, and is used to model secular trends over the course of the past century. Precise operational definitions of these variables will be given below.

Hypotheses regarding the intercept of the micro equation. Since the intercept indicates the expected level of education for men with within-context average social origins, the intercept will reflect whatever factors affect the average level of education. With our data, we can assess the effect of three such factors: the level of societal modernization, a propensity for education levels to increase over time, and a propensity for education levels to be higher in communist regimes than would be expected from their level of modernization.

The increase in education levels as production shifts out of agriculture and artisan shops and distribution shifts away from traditional markets is well known and the explanation is straight forward: outside of agriculture and small shops children cannot work along side their parents, learning vocational skills as they go. Thus, they are sent to school and schools become the primary locus of vocational training.

What is not as obvious is the possibility that there is a secular increase in average levels of education independent of shifts in the distribution of the labor force. However, we think there are good grounds for expecting this to be the case. In virtually all societies, there is great pressure to expand the education system because parents believe (correctly) that education is the primary route to success for their children. Where schools exist at all, the benefits of schooling are visible for all to see: the more schooling people attain, the better their life chances. Since governments tend to be

responsive to such public pressure, over time the availability of schooling expands faster than would be expected simply from the shift in the character of the labor force.[1]

The 40 year experiment with communism in Eastern Europe produced a social system distinctive in many respects, among the most important of which was the imposition of centralized control on many aspects of life. Schools are instruments of social control *par excellence*, serving both socializing and gate-keeping functions. For this reason, we would expect communist regimes to have a special interest in ensuring that all of its citizens are exposed to at least a minimum level of standardized schooling, and thus posit a positive effect of communism on educational expansion net of other factors. (See Rijken, 1997, for a similar argument.)

Hypotheses regarding the effect of social origins. We consider father's education and father's occupation together since we expect the effects of contextual factors to be similar for the two micro-variables. Our main hypotheses are about how educational expansion and educational inequality mediate the effect of social origins on educational attainment. We also consider competing hypotheses regarding the effect of communism.

The main effect of educational expansion should be to reduce the role of social origins on educational attainment. The argument for this expectation is as follows: First, the impact of social origins on the likelihood of moving from one level of education to the next tends to decline for successive transitions. Mare (1980:298-99) has suggested that this necessarily follows from differential selectivity (or, the same thing, differential attrition) at each transition. Since family cultural capital affects not only skills but also motivations and expectations, at each step in the

[1]Of course, educational expansion itself is a force promoting a shift away from agriculture. Those who obtain schooling are generally reluctant to return to their farms and villages and tend to flood into cities to seek non-agricultural work. Still, the dominant causal direction is from shifts in the economy to increases in education, not the reverse.

educational career children from lower status origins will tend to be more highly selected than will children from higher status origins. When transition rates are high, only the very culturally deprived (who tend to be disproportionately from low status origins) fail to continue; when transition rates are low, only the most highly motivated students from low status origins will continue, compared to higher proportions of those from high status origins for whom continued schooling is a normative expectation. The consequence is that the correlations between social origins and (typically unmeasured) intervening variables affecting educational success tend to decline for successive transitions, and thus the reduced-form effects of social origins on the odds of making successive transitions also decline. It then follows that as more students move into the ranges of education for which the effects of social origins are relatively small, the overall effect of social origins on educational attainment will decline,[2] other factors equal (that is, specifically, if the variance in years of schooling and the effect of social origins on the odds of making each transition do not change).[3] We find this line of argument both persuasive and inconsistent with the implication of social reproduction theory that the effect of social origins tends to increase with educational expansion.

All else equal, we expect educational inequality to *increase* the dependency of educational attainment on social origins. The argument follows that advanced by Treiman and Yip (1989:376-

[2]Mare (1981:77-78) has shown this formally, by demonstrating that the linear effects of social origins on the highest level of education completed are weighted sums of the logistic regression parameters for the effects of social origins on the odds of making educational transitions, where the weights are functions of the proportion of persons making each transition. Clearly, if the logistic regression parameters for advanced transitions are small and if the proportions making such transitions are high, the linear effects of social origins will be small.

[3]An additional argument has been advanced by Blossfeld and Shavit (1993:9-10): as more children stay in school, the crucial schooling decisions occur at successively higher ages, when students are less dependent upon the economic circumstances or preferences of their families, thus reducing the dependence of educational transitions on social origins. This is plausible, but unnecessary for our argument. Blossfeld and Shavit contrast this hypothesis, which they label the *life-course hypothesis*, with the argument advanced by Mare, which they label the *differential selection hypothesis*.

77; see also Tyree, Semyonov, and Hodge 1979; Kelley and Klein 1981:18-19), who suggest that educational inequality may be taken as a proxy for social inequality more generally. In societies where social inequality is large, differences in both measured and unmeasured social resources will be large. Thus, the difference in cultural and material capital between those from low and high status origins will tend to be larger in societies with a high degree of social inequality, increasing the impact on the educational achievements of their children. Consider two societies, one in which professionals average 14 years of schooling on average while laborers average four years of schooling and another society in which professionals average 16 years of schooling while laborers average 12 years of schooling. In the second society, the social distance between the children of professionals and laborers is much smaller than in the first society. They will be more likely to attend the same schools and be exposed to the same social opportunities. Thus, the chances are enhanced that the amount of schooling they attain will be depend on their own talents rather than on their father's status.

There are two contradictory arguments regarding the impact of communism on equality of educational opportunity. One claim (e.g., Simkus and Andorka 1982) is that the net impact of educational reproduction was reduced in communist regimes, particularly in their early years, as a result of a kind of "communist affirmative action"–social policies that favored the children of the proletariat and peasantry at the expense of the children of the former bourgeoisie and intelligentsia as well as policies that reduced the cost of education through reductions in fees and the provision of stipends to students to enable them to forgo employment (Simkus and Andorka 1982). Alternatively, new class theorists (e.g., Djilas 1957; Konrád and Szelényi 1979) argue that communist regimes are dominated by well-educated party intelligentsia who act to promote the

educational opportunities of their children and thereby increase intergenerational educational reproduction. We make no *a priori* predictions regarding the relative merit of these hypotheses but rather assess them empirically.

Hypotheses regarding the effect of gender (female = 1; male = 0). Here we consider a set of hypotheses regarding the factors that mediate the gender gap in status attainment. We start with the intercept of the macro equation, which in this case has a meaningful interpretation. What the intercept tells us is the expected difference in average years of schooling between women and men in entirely traditional, non-communist societies in 1900 (since, as we will see below when we specify the macro equations, the values of the remaining variables are zero for this combination of traits). We expect this coefficient to be negative; that is, women are predicted to obtain less schooling than men. This follows from the argument we made above regarding the relative value of educating one's sons and daughters. In traditional societies at the beginning of the century, the value of education for sons should be substantially larger than that for daughters.

As societies modernize, the gender gap in education should be reduced; that is, we expect a positive effect of modernization on the "Female" coefficient. There are two reasons for expecting the gender gap in educational attainment to narrow as societies modernize. First, as women increasingly enter the paid labor force, their need for schooling increases. Whereas high rates of male labor force participation are universal, women are more likely to engage in paid economic activity outside their families as jobs outside of agriculture and the small-shop economy become more prevalent. Second, societal modernization generally brings an increase in publicly financed welfare, particularly old-age pensions. Hence, elderly parents become less dependent upon their children for their own social security. Under these circumstances, education becomes less of an

investment by parents in their own future and more of an investment in the future of their children, which reduces the incentive to devote all of their resources to the improvement of their sons' earning capacities at the expense of their daughters.

For much the same reason that we expect education to expand over time independently of the degree of societal modernization, we also expect the gender gap in educational attainment to narrow. Over the course of the 20th century, the welfare state has come into its own as a major societal type. Much of what used to be regarded as the private concern of individual families is now regarded as the responsibility of the state. While public welfare benefits tend to be more generous in more developed societies, we suggest that a commitment to public welfare has increased more rapidly than would be expected from increasing societal development. As suggested in the previous paragraph, this should have the consequence of equalizing educational opportunities for men and women.

Finally, we expect the gender gap in education to be smaller in communist regimes than in non-communist regimes at comparable levels of development. Communist regimes all have strong public policies promoting gender equality. While many such policies are honored in the breach, the chronic labor shortages faced by many post-war Eastern European societies had the consequence of encouraging high levels of female labor force participation, which created strong pressure to promote the schooling of women in order to prepare them for productive work.

Having specified how we expect the process of educational attainment to be affected by variations in the social environment within which people made their major educational decisions, we now turn to our empirical analysis.

Data and Variables

Data

The data used in this analysis are from 203 sample surveys conducted in 31 nations[4] throughout the world.[5] Appendix A summarizes the surveys, giving the nation surveyed, the date each survey was conducted, the number of male respondents, the number of female respondents, and the total number of respondents. These surveys are drawn from the International Stratification and Mobility File (*ISMF*), which we are continuously updating. Two criteria govern inclusion of files in the *ISMF*: they must be based on a probability sample of a national (or regional) population (or labor force) and they must include information on father's and respondent's occupation.[6]

Although industrialized nations are, of course, over-represented, our coverage of world societies is quite broad. The 31 nations analyzed here include seven former Communist nations from Eastern Europe; five Asian nations (India, Israel, Japan, Malaysia, and the Philippines); and one South American nation (Brazil). Most of the surveys utilized here were conducted from the 1970's through the 1990's, but they range from a 1947 U.S. survey to a 1996 Dutch survey.

We restrict our analysis to persons age 25-64 for whom we have complete information on all variables included in the analysis: educational attainment, father's (or mother's) educational

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[4]In two cases we analyze separate "nations" within single "states": we divide the United Kingdom into England and Wales vs. Northern Ireland; and we divide Canada into Quebec vs. English Canada.

[5]We began with 38 nations, an increase of nine over our previous analysis of 29 nations (Ganzeboom and Treiman 1993). However, we omitted seven nations (Belgium, Finland, France, the German Democratic Republic, New Zealand, Scotland, and Turkey) because information on parental education was not available. In the previous analysis we included nations for which we had information on father's occupation even when we did not have information on parental education.

[6]The complete data base, consisting of all files we have processed, is catalogued on the World Wide Web (http://fswinfo.fsw.ruu.nl/soc/HG/ismf /index.htm xx UPDATE). Access to the catalogued surveys must be arranged with Ganzeboom (HBG.Ganzeboom@fsw.vu.nl) since use of some of the data sets requires the permission of the original investigators.

attainment,[7] and father's occupational status. The lower age cutoff was chosen on the assumption that by age 25 nearly all people will have completed their education, even in highly industrialized countries. The upper age restriction was imposed to avoid non-comparabilities between samples, which have various upper-bounds with respect to age, as well as to minimize the possibility of selection bias due to differential mortality.

We define social contexts by the institutional and demographic circumstance of each nation at the time respondents were age 10-14. While the assumption that nations define distinctive contexts is relatively unproblematic,[8] the appropriate choice for when in the course of school careers the social environment has the greatest impact on pupils is much less clear. We have somewhat arbitrarily settled upon age 14 on the ground that most people are still in school at that age but face their first major decision point–whether to continue on to lower secondary school. We thus conduct multilevel analysis of the effect of father's education, father's occupational status, and gender on educational attainment and of variations in the effects of these social origin variables across contexts defined by crossing nation by schooling cohort. Since our schooling cohorts range from 1894 to 1984, we could have as many as 589 contexts (=31*19). In actuality, we have 336 contexts since we lack data for many cohorts in most nations. Moreover, for 32 contexts we have data only for males (because some surveys were restricted to males), and hence the number of contexts on which we conduct our main analysis is further reduced to 304.

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[7]In cases where father's education was missing, we substituted mother's education in order to preserve cases. Father's and mother's education are known to have similar effects on respondent's educational attainment. Still, the relatively large amount of missing data on parental education is troublesome, especially given that people from low status origins are especially unlikely to know about the education of their parents. In future work, we expect to explore ways of modeling the missing data and hence being able to analyze full samples.

[8](except insofar as there is unobserved heterogeneity within nations because of regional and similar differences in educational systems)

To prepare our data for analysis, we first combined all surveys conducted in each nation, and then for each nation defined "schooling cohorts" by adding 10 years to the year of birth and then cutting the sample into five-year intervals. Schooling cohorts may alternatively be thought of as people age 14 during a five year period, say 1910-1914, or as people age 10-14 in a specific year, say 1910. While a few cohorts include small numbers of respondents, many are very large–so large that when we combined data for all 31 nations, we created a file of more than 30 mb, which created memory problems when we tried to carry out multilevel analysis using HLM on UCLA's cluster of unix machines. To cope with this problem, we set an arbitrary maximum of 500 cases per cohort within each nation, and drew random samples of size 500 as necessary to meet this restriction.[9] The resulting file was something less than five mb in size. The adjustment had the added advantage of reducing the dominance of a few nations with very large samples (the initial U.S. sample included about 74,000 cases, the initial Hungarian sample about 63,000, and the initial samples from Brazil, Canada, Germany, the Netherlands, the Philippines, Poland, and Sweden approximately 20,000-30,000 cases).

Variables

We utilize two kinds of variables: micro-level variables that distinguish the characteristics of individuals, and contextual variables that distinguish the characteristics of social contexts: cohorts by countries.

[9]This was quite easy to do in STATA 5.0, which we used to prepare data for input to HLM.

Micro-variables

Educational attainment. In this paper, we restrict our analysis to the determinants of total educational attainment–that is, "virtual" years of school completed. We refer to this variable as "virtual" years rather than actual years because we engaged in extensive recoding of the data in order to render a wide variety of initial educational classifications comparable within and between nations. Our basic strategy–described in detail in Ganzeboom and Treiman (1993:473-78)–was to recode educational categories to years of school completed where the correspondence was unambiguous and then to interpolate the remaining categories in such as way as to preserve a monotonic relationship between any rank ordering of categories claimed in the original data and our new educational measure. We then validated our preliminary assignments in two ways: by consulting experts on each educational system and by assessing the linearity of the relationships between our new educational measure and various criterion variables (father's occupational status, recoded spouse's education, and respondent's occupational status) and made adjustments as necessary. We think that our resulting scales of "virtual" years of school completed for each country is cross-nationally valid with respect to both the assignment of scores to categories and their distributional properties. The latter is an important claim since we rely heavily upon comparisons of the means and standard deviations of educational attainment across cohorts and nations.

Father's education. We measure father's education using the same coding of "virtual" years of schooling as we used for respondents. We center this variable within cohorts and nations by subtracting the within-context mean from each observation. Thus, what we are measuring is advantage or disadvantage in social origins relative to those attending school in the same nation at the same time.

Father's occupation. We measure father's occupational status when the respondent was growing up (typically the variable refers to when the respondent was age 14) by the *International Socio-Economic Index of Occupations*, the *ISEI* (Ganzeboom, DeGraaf, and Treiman 1992; Ganzeboom and Treiman 1996). All data were recoded from national occupational classifications to the 1968 version of the *International Standard Classification of Occupations* (International Labour Office 1969), for which a standard recode module to assign *ISEI* scores exists (Ganzeboom, DeGraaf, and Treiman 1992). This variable was centered on the within-context mean and divided by 10 to facilitate interpretation.

Gender. This variable is coded 1 for females and 0 for males.

Macro-variables

With one exception ("communism"), we constructed our indicators of the social environment directly from our data. We did this because the paucity of historical data on the indicators of interest to us makes the creation of reliable measures extremely difficult, and we have not yet arrived at a satisfactory set of measures created from external sources.

Educational expansion. This is the mean level of education achieved by each school cohort. While it would have been preferable to utilize a measure of the educational attainment of the adult population at the time the school cohort was age 14, we were reluctant to utilize father's education as our measure because of substantial societal and temporal variations in mean age at paternity and the sometimes non-trivial association between men's education and their fertility, both of which make the education of the fathers of the youth in each cohort a less satisfactory measure of the level of educational expansion than the average educational attainment of the cohort itself.

[xx IN THE NEXT DRAFT, SUBSTITUTE FATHER'S MEAN YEARS OF SCHOOLING TO AVOID HAVING RESPONDENT'S EDUCATION ON BOTH SIDES OF THE EQUATION.]

Educational inequality. This is the standard deviation of education achieved by each school cohort. The above arguments for our choice of a measure of educational expansion apply here as well. [xx MAKE THE SAME SUBSTITUTION.]

Societal development. There are many ways to measure societal development/ industrialization/modernization. However, most such measures are highly correlated. We thus settle for a measure easily computed from our data: the proportion of fathers[10] of each cohort engaged in occupations that were neither in agriculture nor in the traditional sales sector. A large agricultural sector usually denotes under-development. A less conventional measure is the proportion of the male labor force engaged in small retail, service, or craft enterprises, enterprises that tend to be run by families and passed on from generation to generation. Unfortunately, we have no good measure of such employment. We approximate it by counting the proportion of the labor force who are classified as "working proprietors in wholesale or retail trade," "salesmen, shop assistants, and related workers"; or "sales workers n.e.c." in the *ISCO 68* classification.[11] Exploration of the combined measure (proportion engaged neither in agriculture nor in traditional sales occupations) suggested that it better captures under-development than does the simple proportion not engaged in agriculture.

[10]For this variable, in contrast to the education variables, it makes sense to tabulate the characteristics of fathers rather than of respondents, for two reasons: first, "father's occupation when the respondent is age 14" is fixed in time while respondent's occupation is not; second, many women do not have occupations.

[11]Specifically, we defined traditional sales occupations as including *ISCO 68* categories 4100-4109 and 4500-4900 (see Ganzeboom, De Graaf, and Treiman 1992:Appendix B).

Cohort. This variable, used to measure secular trends, was defined simply by taking the last two digits of the ending year of each school cohort. Thus, for example, all members of the 1910-1914 cohort were coded 14 on this variable.

Communism. This is a dummy variable, scored 1 for cohorts 49 through 84 for each of the seven sometime-Communist Central and Eastern European nations in our sample: Bulgaria, the Czech Republic, Hungary, Poland, Russia, Slovakia, and Slovenia, and scored zero for earlier cohorts in these seven nations and for all cohorts in the remaining 24 nations.

Analysis

We estimate two multilevel models, which differ only in the inclusion in the second model of "communist regime" as a macro-level predictor for all micro-level coefficients. The micro-level equation, estimated for each of the 304 contexts for which we have adequate data, is identical for the two models:

$$E = \beta_0 + \beta_1(E_F - \overline{E}_F) + \beta_2(S_F - \overline{S}_F) + \beta_3(F) + \varepsilon \qquad (1)$$

where E = years of school completed by the respondent; E_F = years of schooling completed by the respondent's father; S_F = the status of the father's occupation (that is, the father's ISEI score) when the respondent was approximately age 14, divided by 10; F is a dummy variable, scored 1 for females and scored 0 for males; and ε is the residual, or error term. We expect positive coefficients β_0, β_1, and β_2 and a negative coefficient β_3 in all contexts (that is, all schooling cohorts in each country). Note that because we center the father's education and father's occupation variables around their within-context means, the coefficient β_0 gives the expected years of schooling of the sons of men with average education and average occupational status and the coefficient β_3 gives the

difference between the expected years of schooling of sons and daughters of men with average education and average occupational status.

The average values of the coefficients across the 304 estimated equations are:

$$E = 9.23 + .381(E_F - \overline{E}_F) + .458(S_F - \overline{S}_F) - .521(F) + \varepsilon \qquad (2)$$

This result tells us that if we compare people living in a given country at a given point of time, those whose fathers differ by a year in schooling can be expected themselves to differ by nearly 4/10ths of a year of schooling, net of father's occupational status and gender. Similarly, those whose fathers' occupations differ by 10 points on the ISEI scale would be expected to differ by nearly half a year of schooling, net of father's education and gender. Finally, women on average get about half a year less schooling than men of the same social status living in the same country at the same point in time.

How are these average effects mediated by the social environment? To see this, we inspect the estimates yielded by two alternative versions of a macro-model–one that tests all the hypotheses we discussed above except those regarding the effect of communist regimes and a second that tests these effects as well. We estimate two separate models because of potential problems resulting from the fact that communist regimes represent only a small fraction of our macro-contexts and that even for communist nations the presence of a communist regime is highly correlated with time, since the communist period covers only the 1949-84 cohorts. The first macro-model is represented by

$$\begin{aligned}
\beta_0 &= \gamma_{00} + \gamma_{01}(M) + \gamma_{02}(Y) + \mu_0 \\
\beta_1 &= \gamma_{10} + \gamma_{11}(X) + \gamma_{12}(I) + \mu_1 \\
\beta_2 &= \gamma_{20} + \gamma_{21}(X) + \gamma_{22}(I) + \mu_2 \\
\beta_3 &= \gamma_{30} + \gamma_{31}(M) + \gamma_{32}(Y) + \mu_3
\end{aligned} \qquad (3)$$

where M = the level of modernization of the context, Y = the last year defining the cohort, X = the extent of educational expansion (the mean level of education in each context), I = the extent of educational inequality (the standard deviation of education in each context), and the μ's are the macro-level error terms. The macro equations for the second model are identical except that they also include a dummy variable scored 1 for contexts with communist regimes and scored zero otherwise. The micro- and macro-level equations were estimated simultaneously using the multilevel modeling software package, HLM (Bryk, Raudenbush, and Congdon 1994; see also Bryk and Raudenbush 1992 for an exposition of these models). Coefficients for both models are shown in Table 2. (Descriptive statistics for the macro-variables are shown in Table 1.) [xx IN THE NEXT VERSION, MODIFY TO TAKE ACCOUNT OF AUTO-CORRELATION OF MACRO VARIABLES OVER TIME (ALTHOUGH NOT ACROSS NATIONS). DIPRETE AND GRUSKY (SM 1990) OFFER A WAY TO DO THIS.]

Consider first the determinants of the intercept. Recall that because of the way we have defined the micro equation, the intercept represents the expected level of schooling for men whose fathers' education and occupational status are average for their cohort. We expected the level of schooling to increase with modernization, and indeed it does. The coefficient for "modernization," 9.36, indicates the difference in the expected level of schooling between a society in which all males engage either in agriculture or traditional commerce and a society in which no males do so. Obviously, such societies do not exist; but fairly close approximations to them do. The range of this variable in our data is from .157 to .929, which indicates that the expected difference in average schooling for men in such societies is more than seven years (precisely, 7.23 = (.929-.157)*9.36).

Our second hypothesis regarding the intercept is that it should increase over time, net of the level of societal modernization, because of pervasive pressures by parents to increase the availability of schooling. This hypothesis is confirmed as well. Each year produces an expected increase of .0183 years in the average schooling of men, net of societal modernization. While this coefficient may appear to be quite small, its effect over the course of the century has been quite substantial. It implies that the expected difference in the average level of schooling of the youngest and oldest men in our sample living in societies with the same level of societal modernization is about a year and a half (precisely, 1.46 = (1984-1904)*.0183).

In the second model, which includes a variable distinguishing communist from non-communist regimes, the modernization and secular trend effects remain essentially unchanged. The effect of communism is positive as predicted, implying that the average level of education of men is about 4/10ths of a year higher in communist than in non-communist regimes at the same level of modernization and assessed in the same period; however, the coefficient is not significant at the .05 level and hence cannot be taken too seriously.

Consider now factors mediating the effect of father's education. Once again the data are consistent with our expectations: the effect of educational expansion is negative and the effect of educational inequality is positive. Again, the effects are quite substantial. *Ceteris paribus,* each additional year of average schooling in the population implies a reduction of .0312 in the effect of father's education on respondent's education. Since the range of average years of schooling across contexts is nearly 12 years (13.54-1.76), the expected reduction in the effect of father's on respondent's education between the most and the least educated contexts is .368 (= (13.54 - 1.76)* (-.0312)), a very large effect considering that the mean coefficient is .381 (see Eq. 3). While the

coefficient for the effect of unit changes in educational inequality is even larger, the impact over the range of contexts for which we have data is not so great (albeit still substantial) since variation in educational inequality across contexts is not as large as variation in the degree of educational expansion. Again assessing the impact of changes in educational inequality by comparing its effect across the entire range of our data, we see that, all else equal, the coefficient for the expected effect of father's education is .159 (=(4.68-1.12)*.0446) greater for those in the most unequal environments (that is, where the standard deviation of education is greatest) than for those in the most equal environments.

As before, the magnitude of these coefficients is not much affected by introducing an additional variable to distinguish communist regimes. Interestingly, educational reproduction appears to be stronger in communist than in non-communist regimes, thus supporting the "new class" hypothesis rather than the "communist affirmative action" hypothesis. All else equal, in communist regimes the impact of father's years of schooling would be expected to be about .06 points higher than in non-communist regimes, again a non-trivial effect when compared to the magnitude of the average coefficient.

The role of variations in educational expansion and educational inequality in mediating the effect of father's occupational status is quite similar to their impact on the effect of father's education: the expected difference in the size of the coefficients for contexts with the highest and lowest levels of average education is -.299 (=(13.54-1.76)*(-.0254)), while the expected difference in the size of the coefficients for contexts with the highest and lowest levels of educational inequality is .323 (=(4.68-1.12)*.0908). Recalling that these coefficients measure the effect of a 10

point increment in father's ISEI score (a scale ranging from 10 to 90) and that the average coefficient is .458, we again note that these are very large effects.

Again, introducing a distinction between communist and non-communist regimes has little impact on these effects. However, in this case the data are consistent with the "communist affirmative action" hypothesis and inconsistent with the "new class" hypothesis. All else equal, the size of the coefficient for father's occupational status would be expected to be about .09 points lower in communist than in non-communist regimes, a reduction of considerable magnitude. Contrasting the effect of communism on educational reproduction and on social reproduction as measured by the impact of father's occupational status on the level of schooling attained by their offspring, we conjecture that what is most distinctive about communism, perhaps especially Central European communism, is the ascendency of the intelligentsia. In a system in which the accumulation of material capital is very difficult and the ability to transmit it to one's children almost non-existent, cultural capital is everything–or, to be precise, not a sufficient but nonetheless a necessary condition for social ascendancy. After the earliest years of the regime, membership in the communist party was more open to the educated than to the uneducated–rhetoric about the worker's paradise notwithstanding (Marks, Wong, and Treiman 1995) and access to high political positions depended heavily upon educational attainment (Szelenyi, Wnuk-Lipinski, and Treiman 1995). On the other hand, one of the distinctive features of Central and Eastern European communist regimes was the relative material advantage of skilled manual workers relative to routine nonmanual workers and, in consequence, their relatively higher prestige (Treiman 1977:144-48); this may have been sufficient to undercut the net advantage of non-manual origins generally found in the West.

We conclude this section by considering the factors that mediate the gender gap in educational attainment. In this case, it is meaningful to interpret the intercept of the equation, since it indicates the size of the expected gender gap for entirely traditional societies in 1900. As expected, this coefficient is strongly negative, which tells us that in such environments women would be expected to attain about one and one-quarter fewer years of schooling than would men of identical origin status. As countries modernize, this gap is reduced dramatically. The difference in the expected net gender gap in the least and most modern contexts is .543 (= (90-.15)*.724). Also, as predicted, the gender gap has narrowed substantially over time net of changes in the level of societal modernization: the difference in the expected net gender gap between the oldest and youngest respondents is .536 (=(1984-1904)*.00670). Interestingly, however, the reduction over time appears to be largely explained by the greater gender inequality of communist societies since when communism is introduced as an additional variable, the temporal effect is reduced very substantially and becomes non-significant.

Conclusions

In this paper we have explored how the process of educational attainment–which we characterize as depending on social origins and on gender, men obtaining more schooling than women–varies across social settings. We have defined such settings by the combination of the society in which people live and the period at which they were making important schooling decisions, that is, the year they were age 14. Using data from 31 nations, we defined 304 such settings, or "contexts," for which we had full data on the characteristics of men and women and on relevant macro-social factors.

We have been able to show that both the level of schooling reached in a population and the size of the gender gap (the difference in the average schooling of men and women) depend heavily upon the level of societal modernization of the context (measured by the proportion of fathers engaged neither in agriculture nor in traditional sales occupations). In addition, there is a secular trend toward increased education net of the level of societal development and there is also a secular trend toward increased gender equality in educational attainment, although this latter finding may simply reflect the propensity for communist societies to promote greater gender equality than non-communist societies at the same level of development.

We also have shown that the degree of equality of educational opportunity–as measured by the effect of social origins (father's education and father's occupational status) on educational attainment–depends on two distributional properties of the educational system: the level of educational expansion (the average level of education) and the level of educational inequality (the standard deviation of the level of education). Educational expansion promotes equality of educational opportunity because it moves the bulk of students into that segment of the educational system at which dependence of educational attainment on social origins is weak. Educational inequality promotes social closure through education because it widens the gap in cultural capital between those from low and high status origins.

We explored two contrasting hypotheses regarding the effect of Central- and East-European communism on equality of educational chances. Interestingly, strictly educational reproduction appears to be stronger in communist nations than in non-communist nations. However, the intergenerational transmission of advantage through education (measured by the effect of father's occupational status on his offspring's education) appears to be weaker in communist nations. We

conjecture that this reflects the dominance of cultural capital as a necessary, although not sufficient, condition for political ascendency in systems in which material advantage is hard to gain, harder to sustain, and virtually impossible to transmit to one's children.

The societal variations we have identified are very substantial. To appreciate this, contrast two contexts: persons age 14 at the turn of the century living in a traditional society (85 per cent of fathers engaged in agriculture or traditional sales), with low average education (4 years), and high educational inequality (a standard deviation of 4 years); and persons age 14 near the end of the century (in 1980), and hence young adults today, living in a highly developed society (10 per cent of fathers engaged in traditional pursuits), with high average education (14 years) and low educational inequality (two years). We would expect the coefficient associated with father's education to be .57 in the first context and .16 in the second; the coefficient associated with father's occupational status to be .68 in the first context and .24 in the second; and the gender gap in educational attainment to be 1.16 years in the first context and .08 in the second. These are very large differences. They suggest strongly that systems of social stratification are not all of a piece but vary dramatically depending on the nature of the social structures within which they are embedded.

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Table 1. Descriptive Statistics for Macro-level Variables (336 contexts).

	M	Y	X	I	C
M: Modernization		.56	.79	-.36	.31
Y: Cohort			.57	.03	.44
X: Educational expansion				-.30	.38
I: Educational inequality					-.06
C: Communist regime					
Mean	.594	45.8	8.90	3.12	.125
Standard deviation	.193	17.8	2.50	.64	.331
Minimum	.157	4	1.76	1.12	0
Maximum	.929	84	13.54	4.66	1

Table 2. Macro-level Coefficients for a Multi-level Model of Educational Attainment.

	Model 1		Model 2	
	Coeff.	t-ratio	Coeff.	t-ratio
Intercept				
Intercept	2.64	9.50	2.75	9.52
Modernization	9.36	18.24	9.32	18.13
Cohort	.0183	3.29	.0153	2.61
Communist regime			.393	1.44*
Father's education				
Intercept	.512	7.25	.553	7.81
Educational expansion	-.0312	-7.90	-.0361	-8.54
Educational inequality	.0446	2.87	.0425	2.77
Communist regime			.0636	2.20
Father's occ. status (ISEI)				
Intercept	.418	4.50	.353	3.77
Educational expansion	-.0254	-4.70	-.0181	-3.12
Educational inequality	.0908	4.46	.0940	4.67
Communist regime			-.0902	-2.39
Female				
Intercept	-1.27	-8.69	-1.11	-7.47
Modernization	.724	2.74	.690	2.67
Cohort	.00670	2.35	.00252	.85*
Communist regime			.417	3.40

*Not significant at the .05 level.

APPENDIX A: DATA SOURCES

Study	Men	Women	Total
Australia			
aus65	1661	0	1661
aus67	723	0	723
aus67l	574	0	574
aus73	2633	1458	4091
aus84	958	1001	1959
aus87	584	604	1188
aus87i	584	574	1158
aus889	25	20	45
aus90	556	561	1117
aus92i	813	724	1537
Total	9111	4942	14053
Austria			
aut69	585	634	1219
aut74p	430	641	1071
aut86	297	356	653
aut88	266	329	595
aut89	524	615	1139
aut92i	289	395	684
Total	2391	2970	5361
Brazil			
bra72	407	519	926
bra73	5380	0	5380
bra82	6217	2554	8771
bra88	7007	3557	10564
Total	19011	6630	25641
Bulgaria			
bul91j	504	538	1042
bul93	1596	1741	3337
Total	2101	2279	4380
Canada (except Quebec)			
can65m	398	0	398
can65w	0	410	410
can73	10432	10848	21280
can82w	1050	986	2036
can84	966	1326	2292
Total	12846	13570	26416
Czech Republic			
csk84	1362	1508	2870
csk91e	535	722	1257
czr91j	368	404	772
czr92i	254	253	507
czr93	1897	2197	4094
Total	4416	5084	9500

Study	Men	Women	Total
Denmark			
den72	401	388	789
den72l	316	342	658
den76	1975	1964	3939
Total	2692	2694	5386
England and Wales			
eng63	608	687	1295
eng64	560	631	1191
eng66	610	631	1241
eng69	319	322	641
eng70	8	6	14
eng72	8496	0	8496
eng74p	374	427	801
eng84w	664	603	1267
eng87	343	409	752
eng91j	355	470	825
Total	12337	4186	16523
Finland			
fin72	340	380	720
fin72l	279	262	541
fin75p	399	426	825
Total	1018	1068	2086
German Federal Republic (West Germany)			
ger69e	335	363	698
ger69f	269	337	606
ger72	326	382	708
ger75p	624	748	1372
ger76z	648	723	1371
ger77z	578	690	1268
ger78c	589	764	1353
ger78x	536	783	1319
ger79x	482	652	1134
ger79z	561	677	1238
ger80a	803	877	1680
ger80c	543	694	1237
ger80p	494	523	1017
ger80z	523	618	1141
ger82a	608	654	1262
ger84a	648	677	1325
ger85w	670	355	1025
ger86a	690	726	1416
ger87	341	453	794
ger88a	649	753	1402
ger90a	681	688	1369
ger91j	613	565	1178
ger92i	564	753	1317
Total	12775	14455	27230

Study	Men	Women	Total
Hungary			
hun73	10555	11477	22032
hun82	5055	5683	10738
hun83	10132	11033	21165
hun86	1925	2228	4153
hun90e	297	382	679
hun91j	324	335	659
hun92i	353	402	755
hun93	1499	1588	3087
Total	30140	33128	63268
India			
ind71	1679	389	2068
Ireland			
ire73	1882	0	1882
ire89	324	322	646
Total	2206	322	2528
Israel			
isr74	3713	3405	7118
Italy			
ita63	1236	0	1236
ita68	927	928	1855
ita72	654	690	1344
ita75p	558	582	1140
ita85	1747	1812	3559
ita87i	292	301	593
ita92i	401	442	843
Total	5815	4755	10570
Japan			
jap55	1675	0	1675
jap65	1739	0	1739
jap67	488	554	1042
jap71	1111	1103	2214
jap75	1954	0	1954
jap91j	238	276	514
Total	7205	1933	9138
Malaysia			
mal67	0	4365	4365
mal67l	4743	0	4743
mal76	906	0	906
mal76l	0	1016	1016
Total	5649	5381	11030

Study	Men	Women	Total
Netherlands			
net58	454	519	973
net70	759	610	1369
net71	359	296	655
net74p	358	368	726
net76i	614	66	680
net77	1350	1242	2592
net77e	532	565	1097
net79p	287	269	556
net81e	652	751	1403
net82e	497	494	991
net82n	1656	140	1796
net82u	386	174	560
net85	1669	1583	3252
net85s	327	332	659
net86e	504	527	1031
net86l	1165	1283	2448
net87i	798	886	1684
net90	923	847	1770
net91j	399	300	699
net92	805	797	1602
net94	387	513	900
net94e	595	569	1164
net96	317	275	592
Total	15793	13406	29199
Northern Ireland			
nir68	436	517	953
nir73	1951	0	1951
Total	2387	517	2904
Norway			
nor72	383	397	780
nor72l	316	318	634
nor82w	966	965	1931
nor92i	433	435	868
Total	2098	2115	4213
Philippines			
phi68	6492	6919	13411
phi73	5104	4971	10075
phi92i	127	154	281
Total	11723	12044	23767
Poland			
pol72	3890	3319	7209
pol87	880	785	1665
pol88	2144	2481	4625
pol91	632	673	1305
pol91j	498	551	1049
pol92	519	597	1116
pol929	721	667	1388

Study	Men	Women	Total
pol92i	515	595	1110
pol94	1269	1330	2599
pol94z	664	762	1426
Total	11732	11760	23492
Quebec			
can73q	2709	2780	5489
que60	370	435	805
que65m	126	0	126
que65w	0	128	128
que77	2321	720	3041
Total	5526	4063	9589
Russia			
rus91j	461	509	970
rus92i	502	596	1098
rus93	1187	1694	2881
Total	2150	2800	4950
Slovakia			
csk84	641	710	1351
csk91e	321	345	666
czr92i	150	159	309
slo93	1834	1875	3709
Total	2946	3089	6035
Slovenia			
sln68	837	681	1518
sln80	738	579	1317
sln89	749	603	1352
sln91j	412	513	925
sln92i	387	385	772
Total	3123	2761	5884
Spain			
spa90	2501	2704	5205
Sweden			
swe60	564	589	1153
swe689	7619	7476	15095
swe72	402	401	803
swe72l	337	333	670
swe80w	533	376	909
swe91	267	253	520
swe92i	266	252	518
Total	9988	9680	19668
Switzerland			
swi72	621	679	1300

swi76p	449	444	893
swi87	409	239	648
Total	1479	1362	2841
Taiwan			
tai70	983	0	983
tai70l	623	0	623
Total	1606	0	1606
USA			
?	766	928	1694
usa47	934	1018	1952
usa56	650	795	1445
usa58	539	620	1159
usa60	414	490	904
usa62	16964	0	16964
usa64	586	717	1303
usa66	378	115	493
usa67	805	929	1734
usa68	508	648	1156
usa70	484	601	1085
usa72g	487	478	965
usa73	26429	0	26429
usa73g	429	508	937
usa74g	392	492	884
usa74p	435	539	974
usa75g	417	490	907
usa76g	390	485	875
usa77g	447	505	952
usa78g	414	504	918
usa80g	388	449	837
usa80w	589	599	1188
usa82g	459	594	1053
usa83g	432	559	991
usa84g	357	505	862
usa85g	440	506	946
usa86g	405	469	874
usa87g	476	591	1067
usa88g	395	468	863
usa91j	434	496	930
usa92i	332	432	764
Total	57575	16530	74105