Selective Attrition in a Newly Hostile Regime: The Case of 1980 Sophomores*

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Abstract

For every American birth cohort since 1905 social background effects have declined as the cohort moves through the educational system. Pre-1955 birth cohorts pursued schooling during rapid educational expansion and increasing financial support for higher education. In the 1980s, however, tuitions rose sharply and public financial support for higher education declined. This reversal may have increased the relative importance of social background for college entry. Analysis of High School and Beyond 1980 sophomores suggests that in the 1980s social background became more important for college entry than for high school completion. This finding both captures the experience of more recent cohorts and implies that the previous pattern of declining background effects cannot be understood as primarily the result of selective attrition of the disadvantaged.

Many of those who sought college entry in the early 1980s experienced the period as a fiscal yearly assault on the young, unmoneyed, motivated class. In 1981 eligibility requirements for the Pell grant program were raised, interest rates for Guaranteed Student Loans (GSLs) were increased two percentage points, and a new processing fee of approximately ten percent was deducted from all GSLs right off the top. At the same time as these governmental policy changes were being enacted, many collegiate institutions that had swallowed the exorbitant inflation of the 1970s began the effort to make up lost ground, largely in the form of tuition increases (Evangelauf 1987).

What many students of the early 1980s experienced as a sudden reversal of fortune may have done more than provide material for collective bonding or an excuse for individual nihilism. Indeed, 1980's changes in public policy and organizational behavior may have been so powerful as to alter a relation

between social background and educational attainment that has existed throughout this century. Learning whether these policy changes did or did not change this relation can aid our effort to understand the well-documented historical relation between social background and educational attainment.

Fifteen years of research has shown that for any given grade in schooling g, the returns to social background are greater for grade $g - 1$ (e.g., Mare 1980). This pattern, which implies diminishing returns to social background with each transition from grade to grade, has been evident in the U.S. across cohorts born as early as 1905-14 and as late as 1955-64, and in countries as disparate as Great Britain, Japan, Israel, and Hungary (e.g., Kerckhoff & Trott 1993; Shavit 1993; Szelényi & Aschaffenburg 1993; Treiman & Yamaguchi 1993).

Why, then, analyze yet another cohort of American youth? Two reasons justify this analysis. First, if changes in support for higher education *have* upset the long-standing relation between social background and schooling, then the experience of more recent cohorts is not captured by analyses of older cohorts. Given the extent of the policy changes, and given the possibility that policy can matter, it is worthwhile to investigate this cohort. To date, no study has analyzed the educational history of the students of the early eighties in a framework conducive to comparing their experience with the experience of earlier cohorts.[1] This study fills that void.

Second, even though the pattern of background effects for earlier cohorts has been clear for some time, the *explanation* for the pattern remains contested. Because the more recent cohort encountered a vastly different support structure for higher education than did preceding cohorts, and because the data for more recent cohorts includes information often omitted from standard analyses, analysis of the more recent cohort can elucidate the mechanism behind the historically observed pattern of effects.

Therefore, this article has two related aims. One is to analyze the experience of the would-be collegians of the early 1980s in a way that facilitates comparison with previous work, by relating their story using the language of educational transitions. Another goal is to use the results of that analysis to increase our understanding of the mechanism behind the pattern of effects evident in the cohorts of 1905-55.

Educational Transitions: Logic and Result

THE LOGIC OF EDUCATIONAL TRANSITIONS ANALYSES

One way to investigate correlates of educational attainment is to regress years of school completed on a matrix of explanatory variables. However, ordinary least squares coefficients reflect not only the level of association but also the variance of educational attainment. Because the variance of educational attainment has changed over time given the expansion of educational systems, one cannot compare ordinary least squares coefficients across different cohorts to discern the possibly changing association between social background and educational attainment. To obtain estimates that *can* be compared across cohorts, Mare (1980) proposed that analysts treat education as a series of transitions or school continuation decisions. Mare reasoned that one's total years of school

completed is the result of a series of decisions to stop or continue schooling. If from kindergarten on through the doctoral degree students have the (logical) option of continuing or ending their formal education, each decision to stop or continue is a binary variable, scored 1 for students who continue on and 0 for students who elect to stop.

Mare's approach makes it possible to compare coefficients across cohorts because logit coefficients are not affected by the variance of the dependent variable. Mare's solution not only makes comparisons of coefficients across cohorts meaningful, but also enables investigation of possibly changing effects across *transitions*. By comparing logit coefficients across transitions one can discern whether social factors have different effects at different points in the educational system.

SOCIAL BACKGROUND AND EDUCATIONAL TRANSITIONS: FINDINGS AND EXPLANATION

Researchers have investigated whether the effect of social background changes across transitions, and within a given transition whether the effect of social background changes across cohorts, in at least eighteen countries. Thus, there is ample evidence about the effect of social background for different cohorts and different transitions. In country after country, and in cohort after cohort, researchers have found social background effects to decline across transitions (henceforth called the *waning effects* pattern).[2]

The explanation for the pattern, however, is not clear. Upon finding waning effects of social background in an early educational transitions analysis, Mare (1980) theorized that the pattern might be explained by selective attrition. The selective attrition explanation had three pieces.

First, many indicators of social background are skewed (e.g., there are more families with low income than families with high income). But, the incidence of students with low social background declines across transitions because the most disadvantaged members of any cohort are less likely to make early educational transitions. Because the most disadvantaged members of cohorts tend to drop out at each transition, the mean level of social background rises across transitions. What is counter-intuitive, however, is that the variance of social background *also* rises. This can occur because students leaving school are more likely to come from the lower tail of the social background distribution, which makes the distribution of social background become more symmetrical across transitions. Because the initial distribution of social background is not symmetric, reductions in the skew make it possible for the variance to actually increase.

The second piece of the selective attrition explanation is that the variance of other variables important to educational attainment, such as mental ability, declines across transitions. The third piece of the selective attrition explanation is that the association between social background and other variables, such as mental ability, declines across transitions.

What makes these last two pieces important is that social background has both direct and indirect effects on educational attainment. The association between social background and intervening variables is reflected in the ratio of the covariance of background and the intervening variable and the variance of

social background, i.e., the simple regression β. The third piece of the selective attrition explanation implies that this coefficient declines across transitions.

Given this set of statistical relations, and given that social background has both direct and indirect effects on whether students complete a transition, one would expect the total effect of social background to decline across transitions unless there is some compensating increase in the *direct* effect of social background on transitions or some compensating increase in the direct effect of the intervening variable on transitions. The nearly universal empirical observation is that the total effect of social background declines across transitions.

In contrast to Mare's selective attrition explanation Müller and Karle (1993) speculated that a life-course perspective could explain the associations. Müller and Karle argue that waning effects of background across transitions can be explained by changes in the relationship between children and their parents. Allegedly, parental characteristics decline in value because students, who are older at each transition, are also less dependent economically and socially on their parents with each transition.

Evaluating Explanations of the Waning Effects Pattern

Clearly, the selective attrition explanation and the life-course explanation are not mutually exclusive. One highlights the statistical associations embedded in the data while remaining agnostic as to the substantive processes involved, while the other posits a social mechanism — the changing relationship of family members — that might explain the observed results. Although no adjudication is needed for such complementary explanations, it *is* possible to discern whether the primarily statistical explanation is sufficient or whether it requires substantive elaboration.

One programmatic effort to evaluate the selective attrition explanation has taken the form of cross-national comparative research (e.g., Shavit & Blossfeld 1993). Lacking data on the commonly omitted variables, these analysts have reasoned that one implication of the selective attrition explanation is that as higher percentages of successive cohorts complete higher and higher levels of schooling, transitions should become less selective on social background over time. Thus, increasing heterogeneity of social background across cohorts should allow the effects of social background to *increase* across cohorts. Yet, the cross-national analyses have not found universal increases in the effect of social background across cohorts, even though worldwide educational systems expanded during the period under study (e.g., Meyer et al. 1977; Meyer, Ramirez & Soysal 1992). Thus, the evidence of the cross-national analyses stands against the selective attrition explanation.

However, it is still too early to reject the selective attrition explanation. The cross-national program provides even more examples of the waning effects pattern, even though the analyses cover many different cultural, economic, and political environments. This suggests that something else shared by the many countries may lie behind the explanation. Despite the variation of the nation-states in the cross-national program, each study captured cohorts that experienced an environment of expanding (or at least not contracting) support for

higher education. A better test of the selective attrition explanation is to analyze data on students who encountered a less supportive environment for higher education. The experience and data on the 1980-era cohort provides an opportunity to evaluate the selective attrition explanation in an environment where the policy of support for higher education has begun to be reversed; previous research provides the "before" picture and this analysis of the more recent cohort provides an "after" picture, after Reagan-era policy changes.

Using the more recent cohort to shed light on earlier cohorts, however, is not without its own problems. In order to clarify the comparison with already published analyses of earlier cohorts it is important to set aside competing explanations for the potential distinctiveness of the more recent cohort's experience. Changes in public policy and institutional strategies were not the only factors that may have, for this cohort, increased the importance of social background for later school transitions.

Two *possible* differences between the more recent cohort and earlier cohorts are the levels of achievement and the levels of delinquency. Some have argued that the students of the 1980s, and especially the college-bound youth, were some of the least well-prepared students ever to seek refuge on a college campus. SAT scores had declined precipitously between 1964 and 1982; only after 1982 did a modest rebound in scores begin (Herrnstein & Murray 1994). If for this cohort social background is more important for later educational transitions than for early ones, it may well be because only children of well-to-do parents were insulated from negative changes in elementary and secondary education and the subsequent reduction in measured achievement.

Others have contended that more recent teenagers have higher rates of delinquency than teenagers in the past. Delinquency is negatively associated with high school graduation (e.g., Pallas 1984; Velez 1989). Although trend data on delinquency are difficult to obtain, at least some observers have maintained that several dimensions of delinquency, including violence and early adult-role taking, were higher for 1980-era youth than the youth of the past (e.g., Wynne & Hess 1986). Higher rates of delinquency may have raised the importance of social background for making educational transitions, as the resources that accompany higher social background may either protect students from paying the costs of delinquency or be associated with lower levels of delinquency.

Unfortunately, for earlier cohorts there are no microlevel data on potentially important indicators of delinquency, such as whether the student cut class in high school or was ever suspended in high school. And, although some analyses of earlier cohorts include measures of mental ability, none include measures of achievement. Thus, a direct comparison between this study and others cannot be made.

Still, if any difference between the findings for this cohort and for earlier cohorts is really driven by differences in achievement and delinquency, then one response is to estimate models that include controls for achievement and delinquency. If any distinctive findings for this cohort can be explained by differences in the patterns of achievement and delinquency, then models that control for these factors should reproduce the waning effects pattern observed for earlier cohorts.

Data, Models, and Methods

DATA

I use High School and Beyond (HS&B) Base Year (data collected 1980), First Follow-up (1982), Second Follow-up (1984), Third Follow-up (1986), and High School Transcript (1983) data to analyze the educational transitions of 1980 sophomores. The HS&B sophomores were strategically placed to experience the 1981 shock to higher education funding, as the policy "grandparented" all students currently inside collegiate and postcollegiate institutions. Moreover, the HS&B data contain information sufficient to investigate two important alternative explanations for any change in the pattern of social background effects — the theory of achievement decline and the theory of delinquency increase. Thus, the HS&B data on 1980 sophomores provide a fortuitous opportunity to investigate whether the immediate effect of the 1980's policy changes was to alter the long-standing relation between background and attainment in the U.S., in addition to a chance to evaluate the explanations for the experience of earlier cohorts.

The HS&B base-year study contained a sample of 30,030 students drawn to be representative of American high school sophomores in 1980 and achieved a response rate of 84 percent. The first follow-up survey was conducted on the full base-year sample, while a subsample was selected for the transcript survey undertaken in 1982; these studies contain 29,737 and 15,941 cases, with response rates of approximately 83% and 88% respectively.

The transcripts subsample was used as the sampling frame for the second follow-up. Of the approximately 15,000 cases that were followed-up, 14,825 persons were surveyed for a response rate of more than 98 percent. Students surveyed in the second follow-up were resurveyed in the third follow-up.

MODELS

I estimate logistic regression models of the following form:

$$\log_e\left(\frac{p_{ij}}{1-p_{ij}}\right) = \sum_{j=1}^{J} \beta_{j0} \sum_{j=1}^{J} \sum_{k=1}^{K} \beta_{jk} X_{ik} + \epsilon_{ij} \qquad \epsilon \sim N(0,1)$$

where p_{ij} refers to the probability of person i making transition j, β_{j0} are transition-specific constants, β_{jk} is the effect of variable X_k on the probability of making transition j, and ϵ_{ij} is a person-specific transition-specific error term. With this model it is possible to constrain the effects of any variable X_k to be equal across transitions, or to relax that assumption by specifying interactions between X_k and transition indicator variables. In the models I estimate the effects of each variable are allowed to vary across transitions. The advantage of estimating the model this way is that one may obtain covariances on the estimates of transition-specific βs, which are needed in order to test whether the difference $\beta_{jk} - \beta_{j+1,k}$ is discernibly different from zero for any k. Using LIMDEP 6.0 I obtain maximum likelihood estimates of the logit coefficients.

METHODS

The first transition analyzed is whether students graduate from high school, conditional on their entering 10th grade. Because HS&B data collection began with 1980 sophomores it is impossible to analyze transitions prior to grade 10. However, given the research question, the pivotal comparison for the cohorts of the early 1980s is between high school graduation and college entry. Moreover, enrollment rates are so high before grade 10 that even were the data available it might be difficult to obtain estimates of the effect of social background on earlier transitions (e.g., Kominski 1990). Thus, high school graduation is a convenient, theoretically appropriate, and tractable transition with which to begin the analysis of educational transitions of early 1980's would-be collegians.

Only students who obtain a high school diploma are considered graduates. The study does count as graduates persons who dropped out of high school but returned later and obtained the diploma. It does not count persons who obtained a GED because of existing evidence that the GED and the high school diploma have different economic implications (Cameron & Heckman 1993).[3]

The second transition is whether students enter a four-year college conditional on whether they graduated from high school. Using four-year college entry is consistent with the educational transitions literature's neglect of whether persons completed two-year degrees and with the focus on the bachelor's and higher degrees. Yet, because analysts have traditionally used non-school- based surveys, such as the 1973 Occupational Changes in a Generation (OCG-II) Survey or the General Social Survey (GSS), they have had to reconstruct transitions from years of schooling. Thus, they have been unable to separate four-year college and two-year college entry. This problem with earlier analyses is *not* a plus; in this analysis I primarily analyze entry into four-year colleges.[4] However, to assess whether any differences between my findings and earlier work result from different operationalizations of college entry, I also present an analysis that defines matriculation to either two- or four-year colleges as college entry. This second analysis replicates the definition of college entry used in previous educational transitions research.

Table 1 contains brief definitions of the independent variables used in this analysis. I used all cases for which there was no missing data on the dependent variable. For cases with missing data on any given regressor I substituted the mean value of the regressor and used a control for missing. Finally, as HS&B is a school-based sample, standard errors are adjusted to reflect the clustering in the sample, using a design effect of 2.19 (Sebring et al. 1987).

Results

TESTING FOR THE PRESENCE OF SELECTIVE ATTRITION

There are three pieces to the selective attrition explanation:

(1) Across transitions, the mean level of background rises while the variance of background falls.

(2) Across transitions, the variance of other variables important to educational attainment, such as mental ability, falls.

TABLE 1:   Independent Variables

All variables are recoded to the midpoint for missing cases. With the exception of the social background variables, a control for missing on each particular variable is used. The indicators of missing on social background variables were collinear; thus, one indicator for missing is used to signify missing on at least one social background variable.

Social Background

Fathers occupation

Students responses to a 17-category question were recoded to the 1980 SEI score of the mean of the illustrative occupations in the questionnaire using Stevens and Cho's (1985) updated occupational scores for total labor force based on the 1980 census. Students 1980 responses were taken unless the responses were missing, in which case the 1982 response was taken. Homemakers and military were coded as missing given that there is no SEI code for those pursuits.

Mother's education and father's education

Students responses to a 10-category question were recoded into the following ordered levels: 1 = less than high school graduate; 2 = high school graduate; 3 = some college only; and 4 = college degree or more.

Farm background

Students with mothers or fathers classified as farmers were coded as having farm background.

Male

Students self-report of sex was used.

Family income

Students were asked twice in the base-year and twice in the follow-up to report family income. Base year data are used unless missing; follow-up data are used if the base year is missing. Responses are coded to the midpoint of categories; the unbounded upper category is coded using the Pareto transformation for an unbounded category.

Number of siblings

Students were asked to report on the number of siblings in 1980; as herein used the codes are 0 = none, 1 = 1 sibling; 2 = 2 siblings; 3 = 3 siblings; 4 = 4 siblings; 5 = 5 siblings; 6 = 6 or more siblings.

Parent missing from family

Students report of whether in 1980 or 1982 the student lived with both mother and father (0) or not (1).

Race/ethnicity

The omitted category for three dichotomous race/ethnicity indicators is white.

Black

Students' self-report of black or not

Latino/Latina

Students self-report of Latin ancestry.

Other nonwhite

Students self-report of Native American, Asian, Pacific Islander, or other.

TABLE 1:   Independent Variables (Continued)

Achievement

Seven 10th grade tests are used to control for measured achievement. The tests are in Vocabulary (range 0-21), Reading (0-19), Math I (0-28), Math II (0-10), Science (0-20), Writing (0-17), and Civics (0-10).

Delinquency

College prep program
Transcript data on students course-taking in grades 9 and 10 were used to classify students as noncollege (0) or college (1) track (Lucas 1990).

Cut class
Students' 1980 self-report of whether they cut class every once in awhile (1) or not (0).

Suspension or probation
Students' 1980 self-report of whether they have been suspended or put on probation in school (1) or not (0).

Discipline
Students' 1980 self-report of whether they have had disciplinary problems in school in the last year (1) or not (0).

Heavy dating
Students' 1980 self-report of whether they go out on dates every day or almost every day (1) or not (0).

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(3) Across transitions, the association between social background and other variables declines.

In Tables 2 through 5 I assess whether selective attrition operated on this cohort of high school sophomores.

Table 2 contains the distributions of the standard social background factors, as well as race and ethnicity, for the total sample and for the sample remaining after each winnowing transition. The results appear to replicate the pattern Mare found in 1980. As expected, the distribution of all the background variables became upgraded with each transition. For example, the percentage of students whose mothers had college degrees was 12.9 in the total sample, 14.0 for high school graduates, and 26.7 for those who entered college. Similarly, mean father's occupation and mean family income rise with each transition, while the mean number of siblings and incidence of parent missing families falls. For both father's occupation and family income the standard deviation rises across transitions, while for number of siblings the standard deviation declines slightly across transitions. A check of the skew of occupation and income (not shown) shows that the initial populations are more skewed, and at each successive transition the distribution of these variables becomes more symmetric. These results replicate findings for earlier cohorts; the first piece of the selective attrition explanation holds for this cohort.

TABLE 2: The Distribution of Social Background across Transitions

Variables/Transitions	Total	High School Graduate	Enter College
Sex			
Male	48.7	47.7	49.1
Female	51.3	52.3	50.9
Race/ethnicity			
White	74.1	76.0	84.8
Black	10.0	9.4	6.1
Latino/Latina	12.2	11.0	5.8
Other nonwhite	3.7	3.6	3.3
Mother's education			
Less than high school graduate	18.5	16.3	7.3
High school graduate	40.1	41.3	34.5
Some college	21.7	22.6	28.9
College degree	12.9	14.0	26.7
Missing	6.9	5.8	2.5
Father's education			
Less than high school graduate	21.8	19.9	9.3
High school graduate	28.5	28.8	21.5
Some college	19.8	21.0	23.8
College degree	19.6	21.5	41.6
Missing	10.3	8.7	3.9
Farm background			
Yes	4.2	4.3	3.4
No	86.1	87.1	91.6
Missing	9.7	8.6	5.0
Fathers' occupation			
Mean	39.08	39.87	47.07
Standard deviation	17.47	17.70	18.73
Percent missing	10	9	5
Family income			
Mean	25,568	26,248	32,471
Standard deviation	21,064	22,020	25,665
Percent missing	10	6	3
Siblings			
Mean	2.90	2.81	2.52
Standard deviation	1.62	1.58	1.50
Percent missing	14	14	9
Parent missing from family			
Percent Yes	40	37	28
Percent No	45	54	66
Percent missing	15	9	6
Sample size	11,411	9,795	3,485

TABLE 3: The Distribution of Achievement across Educational Transitions

Variables/Transitions	Total	High School Graduate	Enter College
Vocabulary			
Mean	11.23	11.48	13.63
Standard deviation	3.86	3.88	3.62
Reading			
Mean	9.39	9.61	11.57
Standard deviation	3.51	3.56	3.50
Math I			
Mean	14.93	15.39	18.45
Standard deviation	5.22	5.26	4.87
Math II			
Mean	4.48	4.59	5.53
Standard deviation	1.87	1.92	2.03
Science			
Mean	11.23	11.44	13.06
Standard deviation	3.28	3.29	3.01
Writing			
Mean	10.69	10.97	12.66
Standard deviation	3.48	3.44	3.00
Civics			
Mean	5.99	6.09	6.90
Standard deviation	1.81	1.82	1.72
Sample size	11,411	9,795	3,485

The second piece of the selective attrition explanation is that other co-variates are also selected, and their variance declines across transitions. Tables 3 and 4 detail the changing distribution of 10th grade achievement and delinquency across transitions. The mean level of achievement rises with each transition, and between the second and third transition the variance of achievement falls. But, between the first and second populations the variance rises slightly (e.g., the standard deviation of vocabularly rises by .02 between the total sample and high school graduates, but falls by .26 between the high school graduates and college entrants). Moreover, the reported incidence of delinquency declines across transitions and, as these are dichotomies, the

variance also declines.[5] Thus, the findings in Table 3 and 4 suggest that the second piece of the selective attrition explanation holds for this cohort.

The third piece of the selective attrition explanation is that the association between social background and other factors related to educational attainment declines across transitions. To check the third piece of the selective attrition explanation I regressed each of the intervening variables on the matrix of social background variables, using three different samples: (1) the full sample, (2) high school graduates, and (3) college entrants. The key comparison is between the full and the high school graduate samples because they provide the population of persons eligible for the transitions of this analysis. If the association between background and the intervening variables declines across these transitions, then the third piece of the selective attrition explanation holds for this cohort.

Table 5 contains summary measures of those regressions. For the achievement indicators the association between background and achievement declines across all three samples. Thus, when it comes to the achievement-social background association, the primary association identified in the literature, the pattern of associations for this cohort appears similar to earlier cohorts.

In Mare's original formulation mental ability was the exemplary omitted variable, probably because of the well-understood association between measured mental ability and school success. But note that neither Mare's original analysis nor more recent studies have treated additional omitted factors such as delinquency. Thus, there is no direct point of comparison for the second half of Table 5. Still, this half of the table suggests that the association between delinquency and social background *does* decline across the two key samples, the full sample and the sample of high school graduates. In short, for both achievement and delinquency, the third piece of the selective attrition explanation holds for this cohort.

Taken together, the results of Tables 2 through 5 suggest that the pattern of associations for this cohort is remarkably similar to that of earlier cohorts studied. Each piece of the selective attrition explanation seems to hold for this cohort. Social background becomes upgraded across transitions, but the variance of social background does not decline because the original distribution of social background was skewed. Values on usually omitted covariates do appear to become upgraded over transitions, and the variance of usually omitted variables does decline across transitions. Finally, the association between usually omitted variables and social background does decline over the two key samples of this study. Thus, it is clear that selective attrition is operating in this cohort.

EFFECTS OF SOCIAL BACKGROUND ACROSS TRANSITIONS

In Tables 6 and 7 starred coefficients are discernibly different from zero, while for the enter college column bold coefficients are discernibly different from the estimated effect on high school graduation. Table 6 contains four models of high school graduation and four-year college entry. Model 1, which has only standard social background variables, provides the baseline model of educational transitions. The standard waning effect pattern is not in evidence. Instead, effects are pronounced for high school graduation and larger for college entrance. This pattern holds for the four main parental status characteristics —

TABLE 4: The Distribution of Delinquency across Educational Transitions

Variables/transitions	Total	High School Graduate	Enter College
College prep program			
Yes	38	42	64
No	59	55	33
Missing	3	3	3
Cut classes			
Yes	28	25	18
No	56	62	74
Missing	16	13	8
Suspension or probation			
Yes	12	9	5
No	72	78	87
Missing	16	13	8
Discipline			
Yes	19	16	9
No	65	71	83
Missing	16	13	8
Heavy dating			
Yes	5	4	2
No	80	87	90
Missing	15	9	8
Sample size	11,411	9,795	3,485

parental education, family earnings, and fathers' occupation. Indeed, the difference between the effect of family income, mother's education, and father's education on high school graduation and college entry is statistically significant, and appears substantively large.

Model 2 adds race/ethnicity to the model. The effect of Latino/Latina ancestry is large for the first transition and larger in magnitude but not discernibly larger for the second. Also, the coefficient for black is not discernibly different from zero for both transitions. Yet, the inclusion of ethnicity has no effect on the pattern of social background effects; once again we observe larger effects on college entrance than high school graduation for mother's education, father's education, father's occupation, and family income.

The results of models 1 and 2 are consistent with a shock to the educational system prior to these students' college entry. But, other factors might also

TABLE 5: Association of Social Background with Usually Omitted Variables, Captured by R^2 and "R^2"[a]

Variables/populations	Total Sample	At least High School Graduate	At Least Enter College
Achievement (R^2)			
Math 1	.189	.159	.069
Math 2	.112	.094	.045
Vocabulary	.209	.188	.096
Reading	.163	.140	.055
Science	.169	.147	.091
Writing	.208	.177	.092
Civics	.102	.084	.025
Delinquency ("R^2")[b]			
College prep program	.080	.058	.012
Cut classes	.016	.008	.015
Suspension or probation	.054	.038	.069
Disciplined	.045	.033	.031
Heavy dating	.022	.018	.093

[a] Social background covariates are Farm background, mother's education, father's education, father's occupation, family income, male, number of siblings, and parent missing from family.
[b] "R^2," used for the logit models, is calculated as $1 - (L^2_{Model}/L^2_{Model \ where \ b = 0})$

explain the rising effect of social background on college entry compared to high school graduation for this cohort. For example, measured achievement may explain the pattern observed in models 1 and 2.

Model 3 adds measures of achievement in tenth grade to model 2. Despite the important effect of achievement, as evidenced by the effect of math, writing, civics, and reading on both transitions, the waning effects pattern for social background does not emerge. Thus, whatever truth there may be to the claim that early eighties would-be collegians were unprepared for college work, controlling for achievement does not restore the waning effects pattern.

Model 4 adds delinquency to the model, in the form of college prep program, cutting classes, suspension, being disciplined, and heavy dating, all measured in grade 10. Even after delinquency is added, however, the waning effects pattern remains, indeed, becomes stronger. For the first time all four key parental characteristics — mother's education, father's education, family income, and father's occupation — have statistically significantly larger effects on college entry than on high school completion. In sum, parental education, father's

occupation, and family income are more important for college entry than for high school completion.[6]

Despite the consistency of these results the story remains murky because the foregoing results may be driven by differences between my analysis and earlier analyses' definition of college entry. If the more restrictive definition of college entry is the reason that Table 6 differs from earlier analyses, then relaxing the definition of college entry should restore the waning effects pattern. If the waning effects pattern reemerges there are at least two ways to explain the reemergence.

One explanation is that the findings in Table 6 are an artifact of the more stringent definition of college entry. A second explanation is that my restrictive definition actually masks student and parent responses to Reagan-era policy change; parents and students of this cohort may actually have substituted two-year college for four-year college in response to the rising cost of college.[7] If so, then upon relaxing the definition of college entry the waning effects pattern should reemerge, or, at the very least, the steep increase in the effect of social background should decline. However, the waning effects pattern may not reemerge once the definition of college entry is relaxed. If the waning effects pattern does not reemerge, then the inference of real social change is strengthened. To assess these explanations I redefined college entry as entry to either a two- or four-year college and reestimated the models. This definition of college entry matches the operationalization of college entry used in previous work[8] (see Table 7).

The Table 7 specification does not reverse the findings evident in models 1 through 4. Yes, the gap between the effect of social background on high school graduation and college entry is smaller in the Table 7 analyses, which is consistent with some degree of substitution of two-year for four-year college. But, even so, the waning effects pattern does not reemerge even when the specification of college entry matches the operationalization of the earlier literature. By relying purely on the tests of the difference between coefficients one may conclude that the effects of social background are constant across transitions. Focusing on the trend across transitions one can contend that the effects for college entry are not likely to be smaller and may indeed be larger than the effects for high school graduation. As parents' education, father's occupation, and family earnings always have nominally larger effects for college entry, the waning effects pattern finds little support. Thus, whatever substitution of two-year for four-year college parents and children may have done was not enough to restore the commonly found pattern of social background effects. Thus, the results in Table 7 suggest that the findings in Table 6 are not an artifact of research decisions; instead, real change appears to have occurred.

Given that I found selective attrition to operate on this cohort, one would have expected to find yet another instance of the waning effects pattern. Instead, what we find is that when usually omitted variables are not in the model (models 1, 2, 5, and 6) social background effects increase at exactly the points where the largest reduction in heterogeneity occurs. Moreover, controlling for the usually unmeasured factors directly does not force the waning effects pattern to emerge. Thus, the higher effect of social background on the college entry transition appears to hold *despite* the demonstrated continuation of

TABLE 6: Models of High School Graduation and Four-Year College Entry[a]

Parameter	(Baseline) Model 1		Model 2	
	Graduate High School	Enter Four-Year College	Graduate High School	Enter Four-Year College
Constant	2.087*	-2.857*	2.138*	-2.797*
Farm background	.376*	.031	.382*	.033
Mother's education	.175*	.371*	.162	.366*
Father's education	.267*	.432*	.262	.425*
Father's occupation	.007*	.011*	.007*	.011*
Family income in 10,000s	.032	.079*	.033	.078*
Male	-.312*	.062	-.293*	.075
Number of siblings	-.153*	-.102*	-.152*	-.097*
Parent missing from family	-.908*	-.324*	-.926*	-.311*
Black			.188	.029
Latino/Latina			-.260*	-.528*
Other nonwhite			-.122	.056
Math 1				
Math 2				
Science				
Writing				
Civics				
Reading				
Vocabulary				
College prep program				
Cut classes				
Suspension or probation				
Disciplined				
Heavy dating				
Sample size	11,411	9,795	11,411	9,795

[a] Bold parameter estimates in "Enter College" column signify estimates that are discernibly different from analogous estimate for "Graduate High School" column at or below $\alpha = .05$.

* Parameter estimate discernibly different from zero at or below $\alpha = .05$

selective attrition. This suggests that selective attrition is not the fundamental explanation for either the usual waning effects pattern or for the experience of this more recent cohort.

TABLE 6: Models of High School Graduation and Four-Year College Entry (Continued)

Parameter	Model 3		Model 4	
	Graduate High School	Enter Four-Year Collge	Graduate High School	Enter Four-Year College
Constant	.650*	**-6.131***	1.578*	**-5.805***
Farm background	.340	-.056	.296	-.062
Mother's education	.103*	**.288***	.095*	**.281***
Father's education	.218*	**.350***	.194*	**.332***
Father's occupation	.005	**.008***	.003	**.050***
Family income in 10,000s	.045*	**.113***	.058*	**.124***
Male	-.217*	**.098**	-.094	**.191***
Number of siblings	-.143*	**-.082***	-.135*	**-.077***
Parent missing from family	-.877*	**-.165***	-.800*	**-.110**
Black	.462*	.704*	.369*	.677*
Latino/Latina	-.006	.022	-.027	.061
Other Nonwhite	.048	.439*	.027	.468*
Math 1	.058*	.067*	.036*	.050*
Math 2	.047	**.078***	.025	**.079***
Science	.003	.005	.007	.007
Writing	.064*	**.036***	.050*	**.026**
Civics	.017	**.098***	-.008	**.084***
Reading	-.018	**.046***	-.017	**.044***
Vocabulary	.002	**.047***	-.003	**.045***
College prep program			.825*	.651*
Cut classes			-.668*	-.477*
Suspension or probation			-.720*	**-.256**
Disciplined			-.301*	-.380
Heavy dating			-.624*	-.557*
Sample size	11,411	9,795	11,411	9,795

[a] Bold parameter estimates in "Enter College" column signify estimates that are discernibly different from analogous estimate for "Graduate High School" column at or below $\alpha = .05$

* Parameter estimate discernibly different from zero at or below $\alpha = .05$

Discussion

The analysis above documents in fairly explicit detail the experience of a cohort that attempted to enter college and pursue advanced degrees immediately after unexpected and negative adjustments in the system of public support for higher education. Moreover, this cohort paid tuitions that were strikingly higher than those paid by older alumni.

TABLE 7:   Social Background and Race/Ethnicity Model of Educational Transitions[a]

Parameter	(Baseline) Model 5		Model 6	
	Graduate High School		Enter College	
Constant	2.015*	-2.225*	2.074*	-2.183*
Farm background	.389*	.156	.394*	.161
Mother's education	.179*	.370*	.166*	.367*
Father's education	.263*	.394*	.258*	.388*
Father's occupation	.007*	.009*	.007*	.09*
Family income in 10,000s	.032	.059*	.033	.058*
Male	-.319*	.025	-.300*	.031
Number of siblings	-.154*	-.086*	-.153*	-.081*
Parent missing from family	-.922*	-.303*	-.936*	-.292*
Black			.155*	-.002
Latino/Latina			-.272*	-.406*
Other nonwhite			-.158	.398*
Math 1				
Math 2				
Science				
Writing				
Civics				
Reading				
Vocabulary				
College prep program				
Cut classes				
Suspension or probation				
Disciplined				
Heavy dating				
Sample size	11,411	9,795	11,411	9,795

[a] Bold parameter estimates in "Enter college" column signify estimates that are discernibly different from analogous estimate for "Gruaduate High School" column at or below α = .05.

* Parameter estimate discernibly different from 0 at or below α = .05.

There are sound reasons to point to the eighties era policy changes as the most likely cause of the changed pattern of social background effects. We already have voluminous evidence on cohorts who entered college before the 1980's changes. Most directly relevant is the work of Hout, Raftery, and Bell (1993), whose more recent cohorts had similar rates of high school completion. They found the waning effects pattern in a very similar cohort; thus, the different results reported herein are not likely driven by reductions in the selectivity of high school graduation. Indeed, because their sample was old

TABLE 7: Social Background and Race/Ethnicity Model of Educational Transitions[a] (Continued)

	Model 7		Model 8	
	Graduate High School	Enter College	Graduate High School	Enter Any College
Parameter				
Constant	.598*	-5.168*	1.513*	-4.830*
Farm background	.355*	.119	.314*	.120
Mother's education	.105*	.289*	.098*	.284*
Father's education	.215*	.316*	.191*	.296*
Father's occupation	.005	.006*	.003	.006*
Family income in 10,000s	.043*	.084*	.055*	.093*
Male	-.224*	.050	-.101	.139*
Number of siblings	-.143*	-.062*	-.135*	-.056*
Parent missing from family	-.883*	-.165*	-.807*	-.111*
Black	.434*	.593*	.336*	-.564*
Latino/Latina	-.020	.106	-.044	.129
Other nonwhite	.005	.798*	.020	.847*
Math 1	.058*	.065*	.035*	.050*
Math 2	.044	.067*	.023	.064*
Science	.000	.004	.008	.004
Writing	.063*	.029*	.050*	.021
Civics	.017	.106*	-.008	.093*
Reading	-.018	.032*	-.017	.030*
Vocabulary	.002	.048*	-.003	.045*
College prep program			.841*	.555*
Cut classes			-.651*	-.310*
Suspension or probation			-.717*	-.282*
Disciplined			-.301*	-.454*
Heavy dating			-.528*	-.416*
Sample size	11,411	9,795	11,411	9,795

[a] Bold parameter estimates in "Enter college" column signify estimates that are discernibly different from analogous estimate for "Gruaduate High School" column at or below α = .05.

* Parameter estimate discernibly different from 0 at or below α = .05.

enough to enter college just before the 1980's policy changes, Hout, Raftery, and Bell provide the most directly relevant comparison. The principal difference between their sample and the one I examine is exposure to the 1980's policy changes.

The reversal of policy is one clear factor that separates the experience of this cohort from the experience of previous cohorts. Analyses of earlier cohorts cover a regime of steady expansion of gross educational opportunity, fueled by the postwar GI bill, the erection of a bureaucratized and dispersed scientific

establishment, the elaboration of funding for education of the economically disadvantaged, and the largest peacetime economic expansion in recorded history. The 1980's cohort was the first to encounter a marked retreat from public commitment to advanced educational opportunity.

This retreat appears to have been consequential. The fallout from those institutional and public policy changes seems to have raised the value of social background for college entry relative to high school completion. The increase in value appears to remain even when race/ethnicity, achievement, and delinquency are controlled. Although the inclusion of covariates representing the theory of achievement decline and the theory of delinquency increase does not "prove" the irrelevance of those explanations, it does lend credence to the view that it was macropolicy shifts that altered a pattern that had held for as much of the past for which we have evidence.

The absence of the waning effects pattern, even though selective attrition continued to operate, suggests that for this cohort the driving force behind social background effects was *not* selective attrition. An alternative theory, which suggested that declining student dependence on parents explained the declining pay-off to social background across transitions, cannot be evaluated directly here, but does seem to make more sense of this cohort's experience. Just before this cohort attempted to make the college-entry transition, the rules changed in ways that *increased* students dependence on their parents relative to what it would have been prior to the rules changes. Given the short time for families to develop strategies to cope with those changes, the net effect may have been to make students even more dependent on parents for entering college than they were for completing (universally free) high school. In contrast to this cohort, the parents and children of earlier cohorts may have been better able to plan effectively because the *long-run* trend of public policy was favorable to school continuation.

The implication of these results is that a better understanding of the waning effects pattern observed for earlier cohorts would give greater weight to declining student dependence on parents, while also recognizing that for most cohorts the rules have been so consistent over time that families may have developed strategies for responding to the issue of financing higher education. Even so, the driving mechanism of the process would appear to be something other than selective attrition, perhaps students' dependence on parents, perhaps something else.

As time passes and other members of the cohort obtain bachelors' degrees and advanced degrees, the pattern of effects may fall into line with the patterns observed historically and internationally. Yet, even a transitory change in the pattern of social background effects is momentous, theoretically as well as substantively. Substantively, a transitory change would imply that changes in the rules *at best* served to delay those not born to affluence in their efforts to become full and productive members of the polity, the economy, and the society. Theoretically, even a short-lived revision in the standard pattern suggests that the pattern of waning effects of social background across transitions may rest on an ever expanding (or at least not contracting) system of support for higher education. Halt that expansion and the waning effect pattern may also disappear.

General yet tentative comments about social policy follow from the foregoing analysis. Those of this cohort who obtain bachelors' degrees later than usual, and advanced degrees even later, may be a good example of what I earlier termed the young, unmoneyed, motivated class. As citizens consider additional changes in a variety of policy realms, perhaps the experience of this group, and, more important, the *idea* of cohort-specific shocks, may be worth noting. Cohort-specific shocks are not likely to be limited to this cohort; policymakers may want to consider the general point of whether changing policy in a variety of domains over time may concentrate negative effects on a few "poorly placed" cohorts inadvertently. The young adults of this cohort continue to move through the socioeconomic life-cycle, even as the rules seem to change every time they approach what had appeared from a distance to be common, level ground (e.g., changes in the tax law in 1986 that phased out deductions for nonmortgage interest payments, including educational loans, and defined fellowships as taxable income). As they near the end of their educational odyssey, many now hope that current rumblings for yet another rules change — ending the interest deduction for mortgages — will not become law. If it does, the members of this cohort may find themselves once again heading to the bank just a few years too late, and a few dollars too short, in their effort to make real the American dream for themselves and for their children.

Notes

1. The only study that comes close to analyzing the experience of early 1980s would-be collegians combines the 1955-1964 birth cohorts (Hout, Raftery & Bell 1993). Though that study found the pattern unchanged, the aggregation of 1955-64 birth cohorts may have rendered invisible any change affecting the 1964 cohort.

2. There are two exceptions to this pattern to date. In analyzing Switzerland Buchmann and Charles (1993) explain the discrepancy as the result of the universality of early stages of schooling and the late transition from Gymnasium to University. However, an alternative explanation is that they conflate the *level* and the *type* of institution *from* which and *to* which students are transiting. Thus, their analysis is not in the framework of educational transitions; hence, their evidence remains equivocal. A second exception is Mare's (1981) analysis of nine different American cohorts. Some cohorts did not follow the waning effects pattern; however, sampling variability may explain the discrepancies.

3. I investigated whether my findings were sensitive to the definition of high school graduate. The substantive conclusions of this study do not change with the changed specification.

4. I do not present the analysis of a third transition, completion of a bachelor's degree. Only students who stayed on time after sophomore year of high school completed bachelors' degrees by 1986. Thus, the college completion transition may poorly estimate the effect of social background on ultimate college completion. Yet, college entry was probable by 1986 for most members of the cohort who were going to enter four-year institutions. Thus, the estimates for high school completion and college entry are likely very good, and these two transitions are the key comparisons for the issues treated herein. Results of the third transition analysis are available from the author by request.

5. Some of the operationalizations of delinquency may appear problematic. For example, heavy dating is not delinquent. But the literature has shown that early adult role-taking, such as heavy dating, is associated with dropping out (e.g., Pallas 1984). Also, track location is not a direct indicator of delinquency, but I use it because it is associated with delinquent behavior and it allows differentiation above the middle range.

6. I also estimated a model that included only the delinquency measures, race/ethnicity, and social background. The results matched those obtained for the achievement model.

7. I am thankful to an anonymous reviewer for this suggestion.

8. Means, variances, and summary statistics of regressions (not shown) document that even with the more relaxed definition of college entry, it is correct to maintain that selective attrition continued to operate on this cohort.

References

Buchmann, Marlis, and Maria Charles, with Stefan Sacchi. 1993. "The Lifelong Shadow: Social Origins and Educational Opportunity in Switzerland." Pp. 177-92 in *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*, edited by Yossi Shavit and Hans-Peter Blossfeld. Westview Press.

Cameron, Steve, and James Heckman. 1993. "The Nonequivalence of High School Equivalents." *Journal of Economic Literature* 11:1-47.

Evangelauf, Jean. 1987. "Costs of Attending College Appear Likely to Rise Faster Than Inflation for the 8th Year in a Row." *Chronicle of Higher Education* 34;25:A29-30.

Herrnstein, Richard, and Charles Murray. 1994. *The Bell Curve: Intelligence and Class Structure in American Life*. Free Press.

Hout, Michael, Adrian E. Raftery, and Eleanor O. Bell. 1993. "Making the Grade: Educational Stratification in the United States, 1925-1989." Pp. 25-49 in *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*, edited by Yossi Shavit and Hans-Peter Blossfeld. Westview Press.

Kerckhoff, Alan C., and Jerry M. Trott. 1993. "Educational Attainment in a Changing Educational System: The Case of England and Wales." Pp. 133-53 in *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*, edited by Yossi Shavit and Hans-Peter Blossfeld. Westview Press.

Kominski, Robert. 1990. "Estimating the National High School Dropout Rate." *Demography* 27:303-11.

Lucas, Samuel R. 1990. "Course-Based Indicators of Curricular Track Location." Masters Thesis, University of Wisconsin-Madison.

Mare, Robert D. 1980. "Social Background and School Continuation Decisions." *Journal of the American Statistical Association* 75:295-305.

———. 1981. "Change and Stability in Educational Stratification." *American Sociological Review* 46:72-87.

Meyer, John W., Francisco Ramirez, Richard Rubinson, and John Boli-Bennett. 1977. "The World Educational Revolution, 1950-1970." *Sociology of Education* 50:242-58.

Meyer, John W., Francisco Ramirez, and Yasemin Nuhoglu Soysal. 1992. "World Expansion of Mass Education, 1870-1980." *Sociology of Education* 65:128-49.

Müller, Walter, and Wolfgang Karle. 1993. "Social Selection in Educational Systems in Europe." *European Sociological Review* 9:1-23.

Pallas, Aaron. 1984. "The Determinants of High School Dropout." Ph.D. diss., Johns Hopkins University.

Raftery, Adrian E., and Michael Hout. 1993. "Maximally Maintained Inequality: Expansion, Reform, and Opportunity in Irish Education, 1921-75." *Sociology of Education* 66:41-62.

Sebring, Penny, Barbara Campbell, Martin Glusberg, Bruce Spencer, and Melody Singleton. 1987. *High School 1980 Sophomore Cohort Third Follow-Up (1986) Data File User's Manual*. Center for Education Statistics.

Shavit, Yossi. 1993. "From Peasantry to Proletariat: Changes in the Educational Stratification of Arabs in Israel." Pp. 337-49 in *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*, edited by Yossi Shavit and Hans-Peter Blossfeld. Westview Press.

Shavit, Yossi, and Hans-Peter Blossfeld. 1993. *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*. Westview Press.

Stevens, Gillian, and Joo Hyun Cho. 1985. "Socioeconomic Indexes and the New 1980 Census Occupational Classification Scheme." *Social Science Research* 14:142-68.

Szelényi, Szonja, and Karen Aschaffenburg. 1993. "Inequalities in Educational Opportunity in Hungary." Pp. 273-302 in *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*, edited by Yossi Shavit and Hans-Peter Blossfeld. Westview Press.

Treiman, Donald J., and Kazuo Yamaguchi. 1993. "Trends in Educational Attainment in Japan." Pp. 229-49 in *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*, edited by Yossi Shavit and Hans-Peter Blossfeld. Westview Press.

U.S. Department of Education Center for Education Statistics. 1988. High School and Beyond, 1980: Sophomore Cohort Third Follow-Up (1986) [computer file]. Washington, D.C.: Center for Education Statistics [producer]. Inter-University Consortium for Political and Social Research [distributor].

Velez, William. 1989. "High School Attrition among Hispanic and Non-Hispanic White Youths." *Sociology of Education* 62:119-33.

Wynne, Edward A., and Mary Hess. 1986. "Long-Term Trends in Youth Conduct and the Revival of Traditional Value Patterns." *Educational Evaluation and Policy Analysis* 8:294-308.