Examining the Relationship Between Educational Attainment, Age/Cohort, and Dependent Variables

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GSS Methodological Report No. 90

November, 1997

This research was done for the General Social Survey project directed by James A. Davis and Tom W. Smith. The Project is supported by the National Science Foundation, Grant No. SES-9122462.

Previous research (Smith, 1993; Smith, 1995) documents the well-known trend that educational attainment has increased across generations during the 20th century. As Table 1 shows, both mean years of schooling and the percent obtaining a college degree rose rapidly across cohorts up to those born in the 1940s and then have essentially levelled-off. The increase in educational attainment across cohorts means that in any recent cross-sectional survey age and educational attainment are negatively related. Analysis of the General Social Surveys (GSSs) and American National Election Studies from 1984 to 1991 show Pearson's correlations of -.250 to -.295 (Smith, 1993).

However, the general historical trend and the overall substantial negative relationship between age and educational attainment masks certain important variations in the relationship between educational attainment and age. As Table 2 indicates, mean age generally falls as highest degree obtained rises, but there is a curvilinear relationship with age falling from those without a degree to those with an associate degree and then rising to those with a graduate degree. This curvilinearity results from two distinct circumstances. First, those with associate degrees are the youngest group because of a cohort effect. Associate degrees were rare before the 1960s when community colleges and two-year programs within universities were greatly expanded to accommodate the baby boomers.[1] Thus, holders of associate degrees are overwhelmingly middle-aged or younger. Second, graduate degree holders are older than those with lower degrees. In part this is because it takes more years to earn a graduate degree. Even restricting the comparisons to those 25+ does not fully compensate for this fact.[2] It is also likely that a significant share of graduate degree holders returned to school to pick up a master's degree after some years in the work force.[3] These factors mitigate against the negative association between age and educational attainment generated by the general historical trend that increased educational attainment across cohorts.

Both the general association between age and education and the extra complexities connected with associate and graduate-level degrees obscure the relation of educational attainment to various

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[1]The National Center for Educational Statistics historical series on degrees earned does not tabulate associate degrees before 1969-1970.

[2]However, raising the bar to 30+ does reduce the age edge that graduate degree holders have over those with bachelor's degrees. The 3.8 year increase (47.1 - 43.3) is more than halved among those 30+ (48.1 - 46.6 = 1.5).

[3]A survey of master's degree students in 1989-90 indicated that more than half were 30+ and two-thirds were part-time students. Thus, most had probably returned to graduate school after some period out of school (O'Brien, 1992).

dependent variables. First, age can create the appearance of curvilinear relationships with education. As Table 3A shows, being retired has a curvilinear relationship with educational attainment in the raw data. But when controlled for cohort, a simple monotonic relationship emerges.[4] Similarly, Table 3B indicates that the apparent curvilinear association between educational attainment and having children less than six years old in the household is transformed into a much more linear association when cohort is adjusted for.

Second, cohort standardization can eliminate irregularities in relationships with education. As Table 3C shows, dissatisfaction with one's financial situation generally falls as educational attainment rises, except for the relatively high dissatisfaction of those with associate degrees. Controlling for cohort reveals a nearly linear association. Likewise, Table 3D indicates that support for the traditional position that women should be helpmates monotonically declines with education once cohort is controlled for.

In these examples, the relationships in general and the deviant position of those with associate degrees in particular result from how age/cohort is related to the educational categories (e.g. the relative lack of older respondents among those with associate degrees) and simpler, more linear associations emerge when cohort is taken into consideration. Of course, as Table 4 shows, cohort standardization does not explain or clarify all non-linear associations with education. Table 4A shows a strong curvilinear relationship between liking oldies rock and education. Controlling for cohort questions whether there is really a curvilinear association, but certainly does not reveal a simple underlying relationship.[5] Table 4B indicates that the lower than expected happiness of those with associate degrees is not explained by cohort, but actually somewhat magnified. In this case, the somewhat marginal nature of some associate degrees and the likelihood that for some an associate degree represents more a failure to obtain a 4-year degree than an educational achievement rather than age/cohort differences probably cause the irregularity (Smith, 1982; Smith, 1995).

In brief, the confounding and complex relationship between education, age/cohort, and other variables is a prime example of the need for introducing control variables in analysis. Age/cohort frequently obscures the association between education and other variables and controlling for age/cohort can clarify many relationships.

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[4]Cohort is controlled for by weighting the data to give all categories of education the same cohort distribution as the sample as a whole.

[5]On the association of musical tastes to cohorts see Smith, 1995.

Table 1

Educational Attainment by Cohort

(25 years old +)

Born	Mean Years of School	% with College Degree
Pre-1910	10.8	13.7
1910-1919	11.3	14.1
1920-1929	11.9	18.4
1930-1939	12.6	25.0
1940-1949	13.7	35.9
1950-1959	13.7	35.9
1960-1969	13.6	32.9
1970+	13.9	38.5
	(9161)	(9158)

Source: 1990-1996 General Social Surveys (GSSs)[a]

[a] The GSSs are full-probability, in-person interviews of adults living in households in the United States. For full details see Davis and Smith, 1996.

Table 2

Mean Age by Educational Degree

(25 years old +)

No degree	56.0
High School	46.2
Junior College/Associate	41.2
Bachleor's	43.3
Graduate Degree	47.1
	(9158)
Linearity	.000
Deviation from Linearity	.000
r	-.172

Source: 1990-1996 GSSs

Table 3

Educational Attainment by Labor Force Status, Children Under 6, Financial Dissatisfaction, and Helping Husband's Career

Degree	A. % Retired	
	Raw	Cohort Standardized
No degree	23.2	23.7
High School	10.4	13.0
Junior College/Associate	5.3	10.6
Bachelor's	7.1	8.0
Graduate	9.5	4.3
	B. Mean Number of Children LT 6	
	Raw	Cohort Standardized
No degree	0.21	0.29
High School	0.25	0.24
Junior College/Associate	0.30	0.24
Bachelor's	0.26	0.21
Graduate	0.24	0.225
Linearity	.013	.003
Deviation from Linearity	.019	.198
	C. Mean Dissatisfaction	
	Raw	Cohort Standardized
No degree	2.05	2.15
High School	2.02	2.01
Junior College/Associate	2.05	2.00
Bachelor's	1.83	1.80
Graduate	1.73	1.72
Linearity	.000	.000
Deviation from Linearity	.000	.012
	D. % For Wife Helping Husband's Career	
	Raw	Cohort Standardized
No degree	41.3	33.0
High School	22.3	23.1
Junior College/Associate	13.6	18.7
Bachelor's	15.3	15.9
Graduate	13.3	13.0

Source: 1990-1996 GSS

Table 4

Educational Attainment by Musical Tastes and Happiness

Degree	A. % Liking Oldies Rock	
	Raw	Cohort Standardized
No degree	16.7	19.7
High School	28.5	28.5
Junior College/Associate	32.8	29.1
Bachelor's	26.5	21.8
Graduate	23.9	26.1
	B. % Very Happy	
	Raw	Cohort Standardized
No degree	28.6	28.4
High School	30.7	31.0
Junior College/Associate	30.0	29.6
Bachelor's	39.3	41.0
Graduate	41.3	40.2

Source: 1990-96 GSS

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