

# Educational Pathways and Change in Crime Between Adolescence and Early Adulthood

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## Abstract

*Objectives:* This article examines the relationship between intergenerational educational pathways and change in crime. Moreover, it examines the potential mediating roles of family and employment transitions, economic stressors, and social psychological factors. *Method:* Data from the National Longitudinal Study of Adolescent to Adult Health ( $N = 14,742$ ) and negative binomial models are used to assess associations between educational pathways (i.e., upward, downward, and stable) and change in crime between adolescence and early adulthood. Selection effects are assessed with lagged dependent variables and controls for self-control, grades, and the Add Health Picture Vocabulary Test. *Results:* Intergenerational educational pathways are significantly associated with changes in crime. Downward educational pathways were predictive of increases in crime, whereas upward pathways were associated with decreases in crime. These associations were partly mediated by family transitions, and more strongly by economic stressors. These results were robust to controls for selection related variables.

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**Conclusions:** This study is among the first to examine the relationship between intergenerational educational pathways and crime in the United States. Both upward and downward changes in educational attainments were found to be significant for crime. These findings are notable given the continuing expansion of higher education as well as concerns regarding increasing stratification and downward mobility in the United States.

### **Keywords**

education, role transitions, life course theory, social mobility

## **Introduction**

A global recession, rapidly increasing economic inequality, and perceptions of a disappearing middle class make the prospects of declining socioeconomic fortunes a growing concern within the United States. At the same time, the increasing rewards of a college degree and expanding enrollments of women and first-generation college students suggest the potential for upward mobility in educational attainment (Diprete and Buchmann 2006; National Center for Educational Statistics [NCES] 2015; Pascarella et al. 2004). Though the study of the intergenerational transmission of education has a long history within sociology and criminology, contemporary studies of its relationship to crime are surprisingly few in number (Savolainen et al. 2014).

That educational attainment is negatively associated with crime is fairly well established. At the secondary level, studies have shown dropping out of high school to predict delinquency and crime (Farrington 1989; Thornberry, Moore, and Christenson 1985) and that vocational coursework and better teacher–student ratios reduce the likelihood of adult incarceration (Arum and Beattie 1999; Arum and LaFree 2008). With respect to postsecondary education, research has found years of education to prevent adult incarceration (Arum and LaFree 2008) and college attendance to prevent adult offending (Ford and Schroeder 2011). Though some research suggests the relationship between high school dropout and offending may be driven by unobserved selection (e.g., Sweeten, Bushway, and Paternoster 2009) or vary by the reasons a student drops out (Bjerk 2012; Jarjoura 1993, 1996), other studies have exploited variation in compulsory schooling laws to indicate a more causal relationship (Hjalmarsson, Holmlund, and Lindquist 2015; Lochner and Moretti 2004; Machin, Marie, and Vujić 2011).

Studies of crime across the life course focus attention on adult transitions, such as marriage and employment, as potential turning points

associated with reduced criminal behavior (Jacob 2011; Sampson and Laub 1993; Siennick and Osgood 2008). Few studies, however, have considered educational completion as an adult role that might be associated with changes in crime. One exception is Ford and Schroeder (2011), who found pursuit of any higher education to be associated with desistance among respondents with higher juvenile delinquency in the past. This finding is suggestive of an important distinction. Many studies of role transitions implicitly assume that they represent a (positive) turning point in the life course. This assumption is fairly plausible in studies based on institutionalized samples, in which many have dropped out of the educational system, and for whom the alternatives are poverty, homelessness, or a return to prison. In general population samples, in contrast, whether completing high school or a college degree is really a turning point likely depends on how it relates to an individual's longer socioeconomic trajectory and compares to the educational attainments of parents. This raises the concept of intergenerational educational pathways. For those growing up in poverty, any achieved education may represent a positive turning point in the life course. For those growing up in middle class or more advantaged circumstances, however, the meaning of education may be contingent on whether the achieved level represents upward or downward mobility (versus stability) within a longer-term intergenerational trajectory.

Few previous studies have considered the relationship between educational pathways, or educational mobility, and crime. One exception, by Savolainen and colleagues, found little evidence that educational mobility was associated with decreased crime in a Finnish sample (Savolainen et al. 2014). Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), this study applies a life course perspective to analyze the relationship between intergenerational educational pathways (i.e., one's own educational attainment in relationship to parents' attainment) and change in crime between adolescence and early adulthood. We hypothesize that upward educational pathways will be associated with reduced crime and that downward pathways will predict increases in crime over the life course.

## **Literature Review**

### *Education and Crime*

Criminological studies have long posited, and largely observed, a negative relationship between various measures of educational success (e.g., high

school completion, years of education, postsecondary education, test scores) and delinquency, crime, and incarceration (see review by Payne and Welch 2013). For example, research by Thornberry et al. (1985) showed that dropping out of high school was positively associated with future criminal behavior, which contrasted with earlier research observing decreases in delinquency in the short-term immediately following dropping out (e.g., Elliott and Voss 1974). Work by Jarjoura (1993) found that the consequences of dropping out depended on the reasons one dropped out and social class, with dropping out more strongly associated with offending among higher income youth (Jarjoura 1996). Though research by Sweeten et al. (2009) using the National Longitudinal Survey of Youth suggests the correlation between high school dropout and delinquency may be spuriously driven by unobserved factors, Bjerck (2012) used propensity score models to show that those who felt pushed out of school (e.g., by poor grades) were more likely to offend than those pulled out of school by family and other obligations. Other studies have exploited variation in compulsory attendance laws to show that years of education is associated with decreased offending and imprisonment (Hjalmarsson et al. 2015; Lochner and Moretti 2004; Machin et al. 2011).

Research by Arum and colleagues (Arum and Beattie 1999; Arum and LaFree 2008) further shows that years of education and pursuit of postsecondary education reduce an individual's risk of incarceration. This work also suggests that the importance of higher education has grown over time (Arum and LaFree 2008). Using data from the National Youth Survey, Ford and Schroder (2011) found that pursuit of any education beyond high school was associated with less offending among those who were delinquent in adolescence. Lastly, Hagan and Parker (1999) used a longitudinal Toronto sample to show that intergenerational continuities in educational disinvestment were associated with higher delinquency in the next generation.

### *Educational Pathways and Crime*

Hagan and Parker's (1999) study is unique in its consideration of intergenerational patterns of educational attainment. Indeed, a limitation of much of previous research has been a tendency to treat the relationship between education and crime statically. Very few have considered how intergenerational changes in education—that is, educational pathways—are related to crime. In fact, the authors of one recent exception noted, “we are not aware of a single prior study that examines individual differences in criminal behavior from the perspective of intergenerational social mobility,” which

they measured in terms of education (Savolainen et al. 2014:165). Using data from a Finnish birth cohort, they concluded that neither downward nor upward educational mobility were significant predictors of crime in the transition to adulthood (i.e., ages 15 to 22). However, they did find that parent's educational resources buffered the effect of one's own educational track on crime (Savolainen et al. 2014).

Although not focused specifically on educational mobility, some of the research previously reviewed on the relationship between educational attainment and crime is suggestive of mobility effects. For example, Jarjoura's (1996) finding that dropping out of high school was more consequential for offending among middle-class youth is consistent with the idea that downward mobility creates strains conducive to crime. Similarly, research showing that the relationship between dropping out and crime depends on the reasons for dropping out also hints at the role of educational mobility versus immobility (Bjerk 2012; Jarjoura 1993).

A consideration of educational mobility is particularly important in light of the continuing expansion of higher education in the United States, as well as its increasing value relative to a high school degree. For instance, the percentage of 18- to 24-year-olds enrolled in postsecondary education has risen from about 25 percent in 1965 to 41 percent in 2012, with even sharper increases among women (NCES 2015). Women now outpace men in both enrollments and college completion, in part due to the increasing income returns to higher education (Diprete and Buchmann 2006). These trends suggest a considerable degree of intergenerational educational mobility, as do concerns regarding the challenges of being a "first-generation" college student (Pascarella et al. 2004). Research also suggests that four-year college completion is an important leveler of opportunities (Torche 2011), whereas the increasing importance of educational attainment for risks of incarceration (Arum and LaFree 2008) also points to the need for additional research in this area.

The concept of intergenerational pathways draws upon the life course perspective, which conceives of lives as composed of multiple interrelated trajectories, with trajectories accentuated or redirected by sequences of life course transitions (Elder 1998; Macmillan and Copher 2005; Sampson and Laub 1993). In some cases, transitions such as dropping out of high school or transitioning between high school and college represent a continuity of advantage or disadvantage. For example, recall Hagan and Parker's (1999) elaboration of intergenerational processes of educational capitalization versus disinvestment and their implications for crime. Sampson and Laub's (1997) concept of cumulative disadvantage similarly describes how early

problem behavior knives off future opportunities such as completing high school or going to college, which in turn produces a continuity in offending over time. In others cases, transitions may represent positive or negative turning points that redirect personal or intergenerational trajectories (Sampson and Laub 2003).

### *How Do Educational Pathways Matter?*

There are a variety of mechanisms through which particular educational pathways might be expected to increase or decrease crime over the life course. Perhaps most obvious is the fact that educational attainment promotes employment and earnings (Grubb 2002). Past research has generally found a negative relationship between employment and criminal activity (Good, Pirog-Good, and Sickles 1986; Jacob 2011; Siennick and Osgood 2008; Van Der Geest et al. 2011), whether due to greater economic resources, changes in routine activities, or increases in prosocial bonds. At the same time, a range of factors may moderate the relationship between employment and crime. For example, the duration and timing of employment may moderate its crime reducing potential (Crutchfield and Pitchford 1997; Uggen 2000; Webster et al. 2007). In addition, jobs providing higher wages, employee satisfaction, and opportunities for advancement are more likely to reduce crime (Calvó-Armengol, Verdier, and Zenou 2007; Cox 2010; Engelhardt, Rocheteau, and Rupter 2008; Uggen 1999; Wadsworth 2006). Thus, to the extent that upward educational pathways promote employment opportunities characterized by greater stability and quality, we expect them to be associated with lower crime. Conversely, to the extent that downward educational pathways are associated with economic stressors such as problems paying bills and food insecurity, they may motivate crime (Agnew et al. 2008).

Prior research has also shown that other adult transitions, such as marriage, may promote desistance (Laub, Nagin, and Sampson 1998), again depending on their stability and quality (Forrest 2014; Laub et al. 1998). Demographic research also finds that marriage is an increasingly stratified institution, with higher marriage and lower divorce rates among those with college degrees (Cherlin 2010). Thus, we will also examine whether family formation transitions, such as marriage, cohabitation, and child rearing, mediate the association between educational pathways and change in crime.

Within the study of social mobility, researchers often make a distinction between destination effects and consequences that can be attributed to mobility itself. The previously discussed gains in employment and

marriageability are perhaps best thought of as benefits accruing to the destination of having completed college. Others argue, however, that mobility itself has consequences that may extend to crime. The classic example is Sorokin (1927, 1959), who argued that any change in social status (up or down) uproots the individual and causes conflicts between new and old norms that may produce psychological distress. While there is little empirical support for Sorokin's general hypothesis (Houle 2011), other research suggests that the direction of mobility matters—that is, that downward mobility is particularly stressful (Houle 2011; Newman 1988).

That emotions are a motivator of crime is a central tenet of general strain theory (Agnew 1992, 2001), which asserts that the experience of strain produces negative emotions, which in turn lead to coping responses such as crime. Strains include losses of valued resources, the occurrence of negative experiences, and other forms of goal frustration (Agnew 1992). Strains that are perceived as unjust or high in magnitude, associated with low social control, and that create incentives for crime are most likely to evoke criminal responses (Agnew 2001, 2006). Downward educational pathways likely result in a loss of economic resources and social prestige, present new negative experiences in the form of economic difficulties and possible social disapproval, and may represent the frustration of middle-class goals. Negative pathways may also be perceived as unjust, particularly for those from advantaged backgrounds who may consider the American dream their birthright (Newman 1988). Indeed, as Newman argues in *Falling From Grace*, downward intergenerational mobility not only has consequences for the individual but also represents a disruption of a “family mobility project” (1988:230).

Our focus on educational pathways, as distinct from educational attainment, also relates to Agnew's contention that *subjective* strains may be more consequential for crime than are *objective* strains (Froggio and Agnew 2007; Wheaton 1990). Subjective strain refers to events that an individual dislikes, whereas objective strain refers to life events that are regarded by most individuals as stressful (Agnew 2001). We contend that low educational attainment is an objective strain. Whether it is a subjective strain likely depends on whether it represents a negative pathway or a continuation from one's upbringing. To capture this subjective side of education, we will incorporate a measure of subjective social standing (Demakakos et al. 2008).

Less often considered are the potential positive consequences of upward mobility. Educational attainment is known to promote a sense of self-efficacy (Ross and Mirowsky 1989; Schieman and Plickert 2008), which

past criminological research has shown to be negatively associated with crime (Ludwig and Pittman 1999). Educational attainment is also associated with lower depression (Miech and Shanahan 2000), in part through promoting a greater sense of control in dealing with life stressors (Ross and Mirowsky 1989). With respect to the benefits of upward educational mobility, however, concerns regarding the adjustment difficulties of first-generation college students temper our expectations regarding large improvements in self-efficacy or psychological well-being (Pascarella et al. 2004).

### *Potential Selection Effects*

A focus on intergenerational patterns of educational attainment raises the important concern of potential selection effects. Perhaps it is not going further in education than one's parents that drives changes in crime, but rather unobserved characteristics of individuals that select them into particular educational pathways. Gottfredson and Hirschi's (1990) general theory, for example, suggests that adolescent characteristics indicative of self-control may drive one's entry into postsecondary education and thus render the hypothesized relationships between educational pathways and crime spurious. Thus, while debates regarding how best to operationalize self-control or whether self-control is fixed or fluid are ongoing (e.g., Burt, Sweeten, and Simons 2014), self-control remains an important explanatory mechanism in criminological research (Baron 2003; DeLisi and Vaughn 2008; Pratt and Cullen 2000; Pratt and Reisig 2011). Other research indicates that poor test scores and lower grades are positively correlated with subsequent delinquency, crime, and incarceration (Arum and Beattie 1999; Farrington 1989; Gottfredson 2001).

### *Summary of the Present Study*

To summarize, the present study assesses the relationship between specific intergenerational educational pathways and change in crime between adolescence and early adulthood (i.e., late 20s to early 30s), within a recent and nationally representative sample of the United States. For the reasons outlined above, we expect upward educational pathways to be associated with decreases in crime between adolescence and adulthood. Conversely, we hypothesize that downward educational pathways will be associated with increases in crime across the life course.

In addition, we assess the role of several mechanisms through which these pathways may be associated with changes in crime, including adult role transitions (e.g., employment, marriage, childrearing), economic strains (e.g., welfare receipt, food insecurity, problems paying bills), and social psychological characteristics in adulthood, including depression, self-efficacy, and subjective social standing. Lastly, reflecting concerns regarding selection effects, we examine the role of individual characteristics, such as grades, vocabulary test scores, and education-related self-control. Moreover, by controlling for prior delinquency and focusing on change in crime, we hope to further minimize the role of stable individual differences.

## **Data and Measures**

### *Data*

Data are from Add Health (Harris 2009), a school-based study of adolescents in the United States, grades 7 to 12, started in 1994 to 1995. Three subsequent waves of data collection have been conducted, the last of which was collected in 2007-08 when respondents were largely between 25 and 32 years of age. Data were collected from adolescents and their peers (including romantic partners), as well as their parents, siblings, and school administrators. This research incorporated data from Waves I and IV.

### *Dependent Variable*

*Crime.* One's involvement in crime was measured at Wave IV based on nine self-reported indicators. Questions asked respondents how often they did any of the following in the last 12 months: deliberately damage property that didn't belong to you; steal something worth more than \$50; go into a house or building to steal something; use or threaten to use a weapon to get something from someone; sell marijuana or other drugs; steal something worth less than \$50; take part in a physical fight where a group of your friends was against another group; get into a serious fight; and hurt someone badly enough in a physical fight that he or she needed care from a doctor or nurse. Each of these items was coded as 0 if the event never happened, 1 if the event happened 1 or 2 times, 2 if the event happened 3 or 4 times, and 3 if the event happened 5 or more times. A sum of all nine responses was used to create the final delinquency and crime variable. Given that each of the nine items ranges from 0 to 3, the final count variable had a possible range from 0 to 27, though the observed values ranged from 0 to 22.

## *Independent Variables*

*Delinquency.* Delinquency was measured at Wave I in the same manner as the dependent variable, with questions asking respondents to report their involvement in the same nine items. Delinquency ranges from 0 to 27.

*Education.* Respondent's education at Wave IV is based on self-reports of the highest degree completed. Education was coded as 1 for those with less than a high school degree, 2 for those with a high school degree, 3 for those with some college, 4 for those who have completed a four-year degree, and 5 for those who completed at least some graduate school. This same coding scheme was used for measuring the attainments of the respondent's parent(s) at Wave I. The only difference being that parents' education is based on the highest attainment of either parent.

*Educational pathways.* Educational pathways can be observed in a transition matrix (see Table 1) cross-tabulating parent's education and respondent's achieved education. A complete log-linear analysis of the relationship between parent and respondent's education is beyond the scope of this analysis, yet it is clear that parents' and respondent's educations covary. As evidence of stability across generations, note that 51 percent of those whose parents attained some college attained the same level themselves. With respect to upward mobility, note that among those whose parents did not graduate from high school, 79 percent completed a high school degree or more, and 11 percent finished college or a graduate degree. There is also evidence of considerable downward educational mobility, such as among the 61 percent whose parents completed a four-year college degree who did not complete college themselves.

Summarizing the transition matrix into its components of parent's education, achieved education, and educational pathways raises methodological challenges. Although a simple measure of the difference between achieved and parents' educations can be calculated, it is not possible to include it in a model that also controls for parents' and respondent's educations, because the three measures are a linear combination of each other (see Houle 2011 for an excellent discussion of these issues).

We address this issue in several ways. First, to minimize the effects of small changes in education, we collapsed our measures into three levels of low, middle, and high education. Not completing a high school degree or its equivalent was considered low education. Having a high school degree and/or some college (including an associate's degree and/or trade schooling)

**Table 1.** Cross-tabulation of Parent(s) and Achieved Education.

Parent(s) Education	Achieved Education						Total
	No HS	HS	Some College	Four-year Degree	Graduate School		
No HS	343 (.21)	403 (.25)	682 (.43)	119 (.07)	57 (.04)		1,604
HS	448 (.12)	942 (.25)	1,720 (.46)	434 (.12)	183 (.05)		3,727
Some college	224 (.06)	613 (.17)	1,879 (.51)	636 (.17)	336 (.09)		3,688
Four-year degree	138 (.04)	399 (.11)	1,718 (.46)	898 (.24)	545 (.15)		3,698
Graduate school	58 (.02)	148 (.05)	840 (.30)	940 (.34)	779 (.28)		2,765
Total	1,211	2,505	6,839	3,027	1,900		15,482
	Low		Mid		High		

Note: Row proportions in parentheses; Unweighted. HS = high school.

placed an individual in the midlevel, and having a four-year degree or higher was treated as high education. Next, we created nine indicator variables representing the possible combinations of parents' and own low, middle, and high levels of education. Though this approach may not allow a simultaneous assessment of the independent associations of origins, destinations, and mobility, we are able to make specific comparisons of respondents following educational pathways that vary in direction and magnitude. In the first set of models to follow, the category of stable middle education is used as the excluded comparison group. In later analyses, we stratify by parents' education, and compare pathways within each level of parents' education.

One concern raised by collapsing the original 25 cells matrix into nine educational pathways is the potential loss of variation. Table 2 shows average crime by the original five by five categorization of parents' and respondent's educations. Though there appears to be some variation lost through collapsing categories, it does not appear to be a large amount. For example, we performed formal tests of mean differences in crime for those who achieved a high school degree versus those completing some college (i.e., the two groups combined to form the new midlevel of education) and found the difference to not be statistically significant. Similarly, there was no statistically significant difference in crime between those completing a four-year degree versus those who went on to complete some graduate school (i.e., the new high education group).

Nevertheless, to further bolster our findings with regard to the association between educational pathways and crime, we also assess the robustness of our results to alternative measurement and model specifications. These include (1) models employing the simple educational change score, and controls for family socioeconomic status (SES), educational attainment, and current employment status; (2) models with dichotomous indicators of upward and downward changes and controls for family SES and achieved SES; and (3) models in which the definition of low for the respondent's achieved education included both less than high school and a high school degree, reflecting structural mobility that might change the meaning of low education over time. In all cases, we found evidence of associations of educational pathways with crime in ways that are consistent with the main results presented here (results available upon request).

*Additional covariates.* Demographic controls included a measure of age at Wave IV (as well as a quadratic term), a dichotomous indicator of sex (with males coded as 1 and females as 0), and five mutually exclusive indicators

**Table 2.** Average Crime by Parent(s) and Achieved Education.

Parent(s) Education	Achieved Education					Total
	No HS	HS	Some College	Four-Year Degree	Graduate School	
No HS	0.47	0.36	0.28	0.19	0.19	1,604
HS	0.51	0.42	0.32	0.14	0.11	3,727
Some college	0.98	0.49	0.40	0.16	0.14	3,688
Four-year degree	0.94	0.50	0.43	0.18	0.12	3,698
Graduate school	1.14	0.41	0.46	0.27	0.13	2,765
Average crime (W IV)	0.67	0.43	0.38	0.20	0.13	

Note: HS = high school.

of race and ethnicity, including non-Hispanic white, non-Hispanic black, non-Hispanic Asian, non-Hispanic American Indian or other race, and Hispanic origin. A dichotomous indicator for an individual living with both of their biological parents at Wave I was also used. Other dichotomous familial variables were measured at Wave IV, including being married with and without children, cohabiting with and without children, and being single with and without children (married with children is the reference category).

Though our focus is on educational attainment, other measures of parents' SES were employed. A continuous measure of parents' occupational status at Wave I was included (see Ford, Bearman, and Moody 1999). Neighborhood disadvantage in adolescence was assessed using data from the Add Health Wave I Contextual Database. It was constructed as the average of four census tract measures, including the proportion of adults unemployed, proportion of families below poverty, proportion of households receiving public assistance, and proportion of households headed by a single mother (Cronbach's  $\alpha = .93$ ).

The respondent's Wave IV labor force participation status was assessed with indicator variables, including currently employed (the reference category), unemployed, disabled or sick, retired or homemaker, active in the military, and currently a student. A dichotomous indicator was created for respondents (or others in the household) who had received any public assistance, welfare payments, or food stamps (since Wave III). A similar control variable was included to assess parents' receipt of public assistance at Wave I.

Self-efficacy was measured at Wave IV as the average of four Likert scale questions asking how often in the past 30 days the respondent: felt that

you were unable to control the important things in your life (reversed coded), felt confident in your ability to handle personal problems, felt that things were going your way, and felt that difficulties were piling up so high that you could not overcome them (reverse coded; Cronbach's  $\alpha = .72$ ). A measure of one's perceived SES was assessed at Wave IV by asking respondents where they see themselves on a hypothetical social ladder compared to others in the United States (ranging from 1 to 10).

Depression at Wave IV was measured as the average of five statements that tap depressive symptoms. Ranging from 0 (never or rarely) to 3 (most or all of the time), respondents were asked how often during the past seven days: you could not shake off the blues, even with help from your family and your friends; you felt depressed; you felt sad; you enjoyed life (reverse coded); and you felt happy (reverse coded; Cronbach's  $\alpha = .85$ ).

To assess economic problems, a count variable summed events that had occurred to the respondent in the 12 months preceding Wave IV, including: you went without phone service due to a lack of money; you did not pay full rent or mortgage due to a lack of money; you were evicted from your apartment or house due to a lack of payments; you did not pay the full amount of utility bills due to a lack of money; you had services from the gas or electric company turned off; and you worried food would run out due to a lack of money.

The issue of potential selection into educational pathways is addressed in several ways. First, we include several measures tapping into prior positive and negative educational experiences. We include a continuous measure of the respondent's self-reported grade point average (GPA). We also include a 3-item measure of education-related self-control, previously employed by Beaver, Ratchford, and Ferguson (2009), composed of items that asked adolescents how often since school started this year (ranging from never to everyday) they had trouble: getting along with your teachers, paying attention in school, and getting your homework done. The items are averaged to create a scale in which higher values are indicative of low educational self-control (Cronbach's  $\alpha = .68$ ). We also control for respondents' scores on the Add Health Picture Vocabulary Test (AHPVT), a 78-item abridged version of the Peabody Picture Vocabulary Test—revised. The items are standardized to follow an intelligence score metric centered on 100 (Halpern et al. 2000). The selection issue is further addressed in models controlling for prior delinquency, which helps to capture stable unobserved differences associated with the outcome. Table 3 provides descriptive statistics for all measures.

**Table 3.** Weighted Descriptive Statistics.

Variable	Mean	SD	Min.	Max
Crime	0.373	1.266	0	22
Delinquency	1.852	3.081	0	27
Low-Mid	0.069	—	0	1
Low-High	0.008	—	0	1
Mid-High	0.105	—	0	1
Low-Low	0.027	—	0	1
Mid-Mid	0.358	—	0	1
High-High	0.188	—	0	1
High-Low	0.012	—	0	1
Mid-Low	0.053	—	0	1
High-Mid	0.179	—	0	1
Male	0.506	—	0	1
Age	28.963	1.882	25	34
Age <sup>2</sup>	842.170	109.301	625	1,156
White	0.675	—	0	1
Black	0.158	—	0	1
Hispanic	0.119	—	0	1
Asian	0.032	—	0	1
American Indian	0.007	—	0	1
Other race	0.009	—	0	1
Married with kids	0.283	—	0	1
Married without kids	0.116	—	0	1
Cohabiting with kids	0.083	—	0	1
Cohabiting without kids	0.108	—	0	1
Single with kids	0.088	—	0	1
Single without kids	0.323	—	0	1
Health leave	0.014	—	0	1
Home maker/retired	0.050	—	0	1
Student	0.029	—	0	1
Unemployed	0.063	—	0	1
Military	0.022	—	0	1
Received welfare	0.245	—	0	1
Parent(s) received welfare	0.098	—	0	1
Lived with biological parents	0.556	—	0	1
Neighborhood disadvantage	0.088	0.068	0	0.646
Parent(s) occupation	3.084	1.705	0	5
Grade point average	2.728	0.892	0.5	4
Add Health Picture Vocabulary Test (AHPVT)	101.431	14.837	14	146
Low self-control	1.124	0.839	0	4
Efficacy	3.790	0.768	1	5

*(continued)*

**Table 3.** (continued)

Variable	Mean	SD	Min.	Max
Perceived SES	4.970	1.789	1	10
Depression	0.565	0.582	0	3
Economic problems	0.524	1.138	0	6

Note:  $N = 14,742$ . SES = socioeconomic status.

## Analytic Strategy

Given the nature of the dependent variable, negative binomial regression models were conducted. Negative binomial regression is best suited for a dependent count variable with skewed variability, which is the case here (skewness = 7.740). The similarities in the measures of crime in adulthood and delinquency in adolescence allow for a lagged dependent modeling strategy in some models, which helps to control for stable differences between persons.

Missing data were handled using multiple imputation via the PROC MI procedure in SAS 9.4, with five imputations needed to achieve the desired degrees of freedom. No additional covariates were included in the imputation process aside from the variables present in the full models. The weighted analytic sample after multiple imputation yielded an  $N$  of 14,742, as 895 cases had missing or nonpositive weights. All models employ the Add Health longitudinal sample weights that adjust for differential probabilities of sampling and retention.

## Results

### *Bivariate Relationships*

An analysis of variance implementing Tukey's multiple comparison of means was conducted at the bivariate level, and the distribution of crime by educational pathways was reflective of our hypotheses (see Figure 1). Regardless of one's educational pathway, the highest reports of crime were among those who achieved low levels of education (less than a high school degree) while those who achieved high levels of education reported the lowest crime (four-year degree and/or graduate school). With regard to stability at respective levels of education, crime was highest among those who were stable at low levels and lowest among those who were stable at high levels of education. As expected, those whose parents had high levels

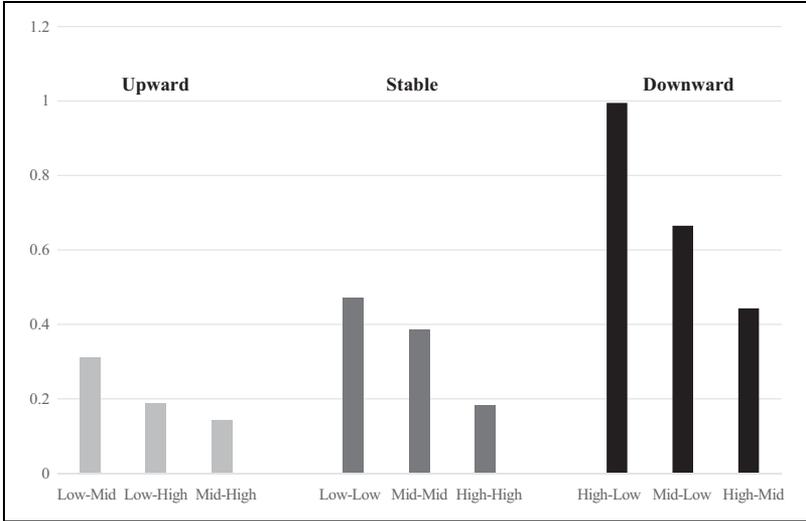


Figure 1. Average crime by educational pathways.

of education but who did not finish high school themselves reported the highest involvement in crime. The difference in crime between those who moved from high to low in education compared to those stable at low levels was statistically significant ( $p < .001$ ), consistent with our expectations.

### Multivariate Models

Table 4 presents the results of negative binomial regression models, in which the coefficients can be interpreted as percentage change in the expected crime count for a one-unit change in the independent variable, after computing  $[exp(b_k x_k) - 1]$ . For example, net of all other factors in model 1, being male increased the expected crime count by a factor of  $[exp(1.09) - 1]$  roughly 197 percent. Model 1 includes eight of the nine indicators of change in education, with intergenerational stability at midlevels of education (i.e., high school diploma or some college for both parents and respondents) the excluded category, as well as demographic and socioeconomic controls from Wave I. This model does not include prior delinquency in adolescence, so it is assessing differences in crime in adulthood, not change in crime.

We begin by focusing on those experiencing intergenerational changes in educational attainment. Compared to being stable at midlevels of

**Table 4.** Crime Regressed on Educational Pathways (Negative Binomial Models).

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	SE	b	SE	b	SE	b	SE	b	SE
Upward										
Low-Mid	.06	(.11)	.19 <sup>†</sup>	(.11)	.25*	(.11)	.23*	(.11)	.20 <sup>†</sup>	(.11)
Low-High	-.36	(.29)	-.04	(.29)	-.05	(.29)	.14	(.29)	.22	(.28)
Mid-High	-.71***	(.11)	-.57***	(.11)	-.56***	(.11)	-.46***	(.11)	-.41***	(.11)
Stable										
Low-Low	.21	(.16)	.04	(.16)	-.02	(.16)	-.13	(.16)	-.15	(.15)
High-High	-.66***	(.09)	-.59***	(.09)	-.64***	(.09)	-.53***	(.09)	-.47***	(.09)
Downward										
High-Low	.68***	(.20)	.55**	(.19)	.46*	(.19)	.26	(.19)	.15	(.18)
Mid-Low	.35**	(.11)	.24*	(.11)	.19	(.11)	.04	(.11)	-.02	(.11)
High-Mid	.11	(.08)	.11	(.07)	.09	(.07)	.08	(.07)	.07	(.07)
Additional Covariates										
Male	1.09***	(.05)	.88***	(.05)	.86***	(.06)	.97***	(.06)	1.04***	(.06)
Age <sup>a</sup>	-.14***	(.01)	-.14***	(.01)	-.10***	(.01)	-.10***	(.01)	-.11***	(.01)
Age <sup>2a</sup>	-.01	(.01)	.01	(.01)	.01	(.01)	.01	(.01)	.01	(.01)
Black	.21**	(.07)	.32***	(.08)	.14 <sup>†</sup>	(.08)	.11	(.07)	.09	(.07)
Hispanic	.03	(.08)	.05	(.08)	.01	(.08)	.07	(.08)	.07	(.08)
Asian	-.27 <sup>†</sup>	(.15)	-.18	(.14)	-.28*	(.14)	-.23	(.14)	-.25 <sup>†</sup>	(.14)
American Indian	.49 <sup>†</sup>	(.27)	.16	(.28)	.14	(.27)	.01	(.27)	.02	(.26)
Other race	-.45 <sup>†</sup>	(.27)	-.21	(.27)	-.38	(.27)	-.35	(.26)	-.29	(.26)
Lived with Biological parents	-.31***	(.05)	-.21***	(.05)	-.18***	(.05)	-.13*	(.05)	-.14**	(.05)
Parent(s) occupation	.02	(.02)	.01	(.02)	.01	(.02)	.02	(.02)	.02	(.02)
Neighborhood disadvantage	-.67	(.45)	-.34	(.44)	-.06	(.44)	-.22	(.43)	-.05	(.43)

(continued)

**Table 4.** (continued)

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	SE	b	SE	b	SE	b	SE	b	SE
Parent(s) welfare	.07	(.09)	.04	(.10)	.05	(.09)	.02	(.09)	-.02	(.10)
Delinquency			.11***	(.01)	.11***	(.01)	.10***	(.01)	.10***	(.01)
GPA <sup>a</sup>			-.05	(.04)	-.03	(.04)	-.01	(.03)	.00	(.04)
AHPVT <sup>a</sup>			.01***	(.00)	.01***	(.00)	.01***	(.00)	.01***	(.00)
Low self-control			.23***	(.04)	.22***	(.04)	.22***	(.04)	.20***	(.04)
Married with no kid(s)					.28**	(.10)	.33**	(.10)	.31**	(.10)
Cohabiting with kid(s)					.74***	(.10)	.62***	(.10)	.60***	(.10)
Cohabiting no kid(s)					.99***	(.09)	1.03***	(.07)	.97***	(.09)
Single with kid(s)					.98***	(.10)	.84***	(.10)	.79***	(.10)
Single no kid(s)					1.01***	(.07)	1.03***	(.07)	.92***	(.07)
Health leave					.47*	(.20)	.31	(.21)	.20	(.20)
Student					.09	(.14)	.01	(.14)	-.02	(.14)
Retired/homemaker					-.16	(.15)	-.26 <sup>†</sup>	(.15)	-.29*	(.14)
Military					-.49**	(.18)	-.41*	(.18)	-.45*	(.18)
Unemployed					.25**	(.09)	.12	(.09)	-.03	(.09)
Economic problems							.24***	(.02)	.18***	(.02)
Welfare							.34***	(.06)	.28***	(.06)
Self-efficacy									-.20***	(.04)
Perceived SES									-.02	(.02)
Depression									.26***	(.05)
Intercept			-1.52***	(.09)	-2.12***	(.11)	-2.79***	(.12)	-3.13***	(.12)
Model $\chi^2$			793.49***		1,139.27***		1,444.01***		1,657.08***	
									1,785.37***	

Note: N = 14,742. Standard errors in parentheses. SES = socioeconomic status.

<sup>a</sup>Centered. <sup>†</sup>p < .1. \*p < .05. \*\*p < .01. \*\*\*p < .001.

education, an intergenerational increase from the midlevel to completion of a four-year degree decreased one's expected crime count by a factor of [ $exp(-.71) - 1$ ] roughly 51 percent. This is an important result, as respondents who graduated from a four-year college but whose parents only achieved some college (i.e., first-generation college graduates) represent a sizable subgroup within the sample (i.e., over 10 percent). Conversely, negative educational pathways, from either high or midlevels of parental education, to not completing high school were associated with higher expected crime counts. Finally, intergenerational continuity of college completion (i.e., the high-high group), compared to midlevels, decreased one's expected crime count by a factor of [ $exp(-.66) - 1$ ] roughly 48 percent.

To partially address the issue of the selection of delinquent adolescents into particular educational pathways, model 2 added controls for adolescent delinquency, GPA in high school, AHPVT scores, and low educational self-control. The inclusion of past delinquency makes it a lagged dependent variable model, and shifts the focus of other independent variables to predicting changes in offending between adolescence and adulthood. Though past delinquency, AHPVT scores, and education-related low self-control were all associated with changes in crime, our indicators of intergenerational educational pathways remained associated with crime in a similar pattern to that of model 1, with decreases in education (compared to one's parents) increasing the expected crime count and increases in education associated with reduced crime.

Next, we controlled for measures of employment status in adulthood, as well as family transitions, such as marriage, cohabitation, and coresidence with children, to see if these partially explain the relationships between educational pathways and crime. Though some coefficients were slightly attenuated in size, most of the relationships between intergenerational change in educational attainment and crime retained statistical significance when controlling for familial and economic characteristics at Wave IV. For example, net of all other covariates in model 3, moving from mid to high levels of education decreased the crime count by [ $exp(-.56) - 1$ ] roughly 43 percent. However, the coefficient for the association of the mid to low pathway with crime was attenuated by about 21 percent (from .24 to .19) and fell out of statistical significance, suggesting a degree of mediation. Note also that those following the low to mid educational pathway were now observed to have a higher expected crime count by a factor of [ $exp(.25) - 1$ ] roughly 28 percent. All family types other than married with children and unemployment (compared to non-military employment) were associated with increases in crime, whereas

being in the military was associated with decreases in crime, compared to nonmilitary employment.

In model 4, we tested whether the associations between specific educational pathways and crime were mediated by economic problems and welfare receipt in adulthood. All previously significant pathway coefficients were attenuated in size, with mediation strongly suggested for both cases of downward mobility. For example, the coefficient associated with the high to low pathway decreased from .46 to .26 (by 43 percent) and was no longer statistically significant. Although coefficients associated with upward pathways were also reduced in magnitude, moving from mid to high and stability at high levels remained associated with reductions in crime.

Lastly, we controlled for several social psychological concepts, including self-efficacy, perceived SES, and depression, that may help explain the remaining associations between educational pathways and change in crime. Though self-efficacy and depression were both associated with changes in crime in the expected directions, they only slightly attenuated the magnitude of the educational pathway coefficients. Even after an extensive list of covariates, moving from mid to high levels of education remained associated with a decreased expected crime count by a factor of [ $\exp(-.41) - 1$ ] roughly 34 percent.

### *Sensitivity Analyses*

To further examine the role of educational pathways, we ran an additional set of models that are stratified by low, middle, and high levels of parents' education (Table 5). Our primary motivation for these analyses was to assess whether associations between change in educational attainment and crime depended on where one started in adolescence. Stratifying also allowed us to make additional comparisons between groups not limited to the stable mid category—that is, the reference categories in these models represent stability at each level of parents' education.

Beginning with those whose parents had less than a high school education (i.e., the low group) in model 1 of Table 5, there were no differences associated with completing higher levels of education. Although of theoretical interest, this is not empirically surprising, given the lack of associations for these groups in the previous models from Table 4. Considerably more action, however, was observed within the other subgroups. Among those whose parents had finished high school and/or some college, both upward and downward changes in education were associated with crime in the expected directions. Compared to those who completed high school, those who did not

**Table 5.** Crime Regressed on Educational Pathways (Stratified by Parent(s) Education).<sup>a</sup>

Variable	Less than HS Degree		Some College		Four-year Degree+	
	Model 1		Model 2		Model 3	
	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE
Low-Mid	-.04	(.19)				
Low-High	-.43	(.36)				
Mid-Low			.31**	(.11)		
Mid-High			-.70***	(.11)		
High-Low					1.50***	(.20)
High-Mid					.81***	(.09)
Model $\chi^2$	75.19***		416.18***		371.40***	

Note: Standard errors in parentheses.

<sup>a</sup>All models include controls from model 1 in Table 3.

<sup>†</sup>*p* < .1. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

finish high school had higher crime in adulthood, whereas those completing a four-year degree reported lower levels of crime. Finally, among those whose parents were college educated, not finishing high school and college were both associated with higher levels of crime. Thus, on the whole, these models suggest that intergenerational changes in education, both upward and downward, are robust predictors of crime, controlling for other factors.

As this is a general school-based sample (i.e., as opposed to one of prior offenders), and we were interested in how educational pathways might predict change in crime for all respondents, our main results are not necessarily about “desistance” from crime. As a further sensitivity check, however, we ran models stratifying for whether respondents had engaged in any delinquency at Wave I. The results (available upon request) are consistent with our main findings; however, a few details are worth mentioning. Among those who were delinquent at Wave I, upward intergenerational pathways were associated with lower levels of crime in adulthood, which is suggestive of desistance. At the same time, one negative pathway, specifically from high to low, was associated with a higher crime count. Among those not engaging in any delinquency in adolescence, both positive and negative pathways were associated with crime in expected directions. One exception was observed for those whose parents had less than a high school diploma and who completed high school or some college themselves (i.e., the low to middle group). This upward pathway was associated with a higher crime level in adulthood.

## **Discussion**

This study represents one of the first examinations of the relationship between intergenerational educational pathways and change in crime between adolescence and adulthood in the United States. Overall, our results suggest that intergenerational change in educational attainment plays a significant role in predicting both crime and changes in crime between adolescence and adulthood. Consistent with our hypotheses, multivariate analyses showed that downward educational pathways were predictive of increases in crime, whereas upward pathways were associated with decreases in crime.

Our findings have implications for the broader literature on educational attainment and crime. For example, contrary to the idea that not completing high school would automatically be associated with higher crime, we found that it depended upon one's parents' education, with those experiencing downward educational mobility into the less than high school category exhibiting increases in crime in adulthood. This is consistent with previous research which found high school dropout to be more consequential for nonpoor youth (Jarjoura 1996). Our finding that high school dropouts whose parents were also high school dropouts did not engage in more crime also seems consistent with the research by Bjerck (2012), who found those who are pulled out of school to work or take care of family did not engage in higher crime than similarly situated counterparts who finished high school.

The lowest crime was observed among those experiencing intergenerational continuity in completion of higher education. This finding resonates with Hagan and Parker's (1999) life course capitalization theory, and their findings that intergenerational investments in education have implications not only for the next generation's crime but also their employment status and family life. The advantages of higher education observed here are also consistent with and extend the work of Ford and Schroeder (2011), who found any college attendance to be associated with desistance from crime among those with higher levels of delinquency in adolescence. Our results are somewhat different, however, in that the middle educational category (which includes some college) was not associated with reduced crime.

Indeed, our results emphasize the importance of completing college and distinguishing four-year from two-year college completion. For example, the crime-reducing benefits of upward pathways were only exhibited by four-year college completers whose parents had some experience with higher education themselves (though not a four-year degree). Whether to actually call these "first-generation" students is a matter of debate, with

some researchers using a stricter definition that only considers those whose parents have no postsecondary experiences beyond high school (Pascarella et al. 2004). Using a stricter definition, being a first-generation college completer (i.e., the low to high group) was not associated with reductions in crime. Moreover, among potential first-generation students who did not attain a four-year degree (i.e., the low to mid group), we observed a slight increase in crime net of covariates. Though we would caution against placing too much emphasis on this result (i.e., given its marginal significance), it may reflect the unique challenges faced by first-generation students (Pascarella et al. 2004). Future research should further examine this group to distinguish those completing two-year degrees from those who started a four-year degree but were unable to persist to completion. In addition, future research might distinguish between four-year college completion and those completing graduate or professional degrees (Torche 2011).

As a study of educational mobility, the findings here most strongly relate to those of Savolainen et al. (2014:179), who found, “no support for the[ir] first hypothesis predicting increased offending among the downwardly mobile,” but that parents’ educational resources buffered youth against their own lower educational attainments. That upward mobility was found to be associated with decreased crime is seemingly in conflict; however, many differences in study design are apparent. For example, their study was based on a Finnish cohort, examined educational attainments in the second generation to age 15, assessed crime only to age 22, and used interaction terms to model educational mobility (as opposed to our categorical educational pathway approach). One might argue that since respondents’ educations were still in process and crime was limited to the early transition to adulthood that it is not surprising that parental education tended to dominate the results. Additionally, they examined the process separately for males and females, which was beyond the scope of the present analysis. Future research into potential differences in the role of educational pathways by gender, however, is clearly needed, particularly given recent increases in women’s college enrollments. In light of the increasing value of higher education, future research might also consider differences in the influence of educational pathways across birth cohorts.

This analysis also sought to examine the role of potential mediators of the relationships between educational pathways and crime (e.g., Crutchfield and Pitchford 1997; Uggen 1999). Although a central focus of research on desistance, which has emphasized the role of adult transitions (e.g., King, Massoglia, and Macmillan 2007; Laub et al. 1998; Sampson and Laub 1993), we found only slight mediation when family formation and

employment statuses were added to the models. Further analysis of the relative roles of family versus employment related transitions (available upon request) revealed that family-related transitions (e.g., being married with children) were primarily responsible for this partial mediation. The importance of familial transitions is consistent with the growing stratification of marriage and divorce by education levels (McLanahan 2004).

More proximal measures of welfare receipt and economic problems were stronger mediators of the remaining associations between downward educational pathways and crime, particularly for those whose parents were college educated (i.e., the high to low group). Reductions in economic troubles also partly mediated reductions in crime exhibited by first-generation college completers. These findings are consistent with recent applications of strain theory emphasizing the role of economic troubles (Agnew et al. 2008). Lastly, social psychological measures of self-efficacy and depression were found to be significantly associated with changes in crime (consistent with De Coster and Heimer 2001; Ludwig and Pittman 1999), but to only slightly mediate the experiences of those exhibiting negative pathways, as well as differences between those who were stably college educated (i.e., the high to high group) and the stable middle education group.

The analysis also took seriously the potential of selection effects or unobserved heterogeneity associated with educational pathways and crime (e.g., King et al. 2007). Of particular concern might be the small percentage of respondent's traversing the high to low educational pathway. Though controlling for past delinquency, GPA, vocabulary test scores, and educational self-control did attenuate associations between educational pathways and crime, most remained robust and retained statistical significance. Yet, we recognize that the possibility of unobserved heterogeneity remains and thus do not make strong causal claims.

### *Limitations*

Several additional study limitations should be noted. Add Health is a school-based sample, so some of the most disadvantaged individuals who had already dropped out of the school system were not included in the analyses. Thus, we are likely missing some of the most dramatic instances of educational failure. Also, an important distinction within studies of social mobility is between intragenerational and intergenerational mobility. We were motivated to focus on intergenerational mobility due to the increasing rates of college attendance and the growth of first-generation students.

Thus, we did not examine intra-, or within-generational educational pathways, such as nontraditional students who go back to school following a lengthy hiatus. Future research should examine this group. Another group to consider are those who do poorly in high school or who have low college aspirations or expectations, but nevertheless continue on for a college degree. Given the increased stratification among higher educational institutions, it is becoming increasingly difficult to treat completion of college as an all-encompassing indicator without considering the quality or prestige of the educational institutions. Unfortunately, measures of prestige, reputation, or other indicators of postsecondary educational quality are not available within Add Health.

We should also recognize that we did not consider other dimensions of intergenerational socioeconomic change, such as changes in occupational status or income. This is due in part to Add Health data constraints, but also to our main interest in educational pathways. Though adolescents were asked about the occupations of their parents, the resulting categories (i.e., professionals, managers) are too crude to match up with the more fine-grained occupational categories of respondents in adulthood. Use of respondent's current occupations would also raise issues of temporal ordering with crime.

## **Conclusion**

With these limitations in mind, the present study has shown that educational intergenerational pathways are associated with change in crime between adolescence and early adulthood, within a large, contemporary, and nationally representative U.S. sample. This issue is critical due to the increasing importance of education, both for socioeconomic outcomes, as well as family life, physical and psychological well-being, and criminal behavior. It is also important, given concerns regarding rising educational stratification and inequality in the U.S. society. As among the first studies of the role of educational pathways, it is hoped that these findings will contribute to future research on this topic.

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