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Predictors of Educational Attainment in the Chicago Longitudinal Study

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The authors investigated a comprehensive set of predictors of high school completion and years of completed education for youth in the Chicago Longitudinal Study, an ongoing investigation of over 1500 low-income, minority children who grew up on high-poverty neighborhoods. The study sample included 1286 youth for whom educational attainment could be determined by age 20. Predictors were measured from birth to high school from participant surveys and administrative records on educational and family experiences as well as demographic attributes. Results from regression analyses indicated that the model explained 30.4% of the variance in years of completed school. The model also predicted accurately 73.3% of youths' observed high school completion status and 72.6% of their high school graduation status. The strongest predictors of educational attainment were maternal educational attainment, school absences and mobility, grade retention, and youth's educational expectations. Findings indicate that students' expectation and school mobility are targets of intervention that can promote children's educational persistence.

Keywords: at-risk youth, predictors, educational attainment, and urban education

Educational attainment is a fundamental indicator of adult well-being. While easily taken for granted, the importance of school completion and postsecondary education continues to grow (Day & Newburger, 2002; McMurrer & Sawhill, 1998). The strong link between educational attainment and income is well known. The average annual income of dropouts ages 25–34 in 2000, for example, was 30% less than the income of high school completers (U.S. Department of Education, 2002). This wage differential is predicted to accelerate further (Heckman, 2000; McMurrer & Sawhill, 1998). There also is considerable evidence that educational attainment affects many other indictors of adult well-being. School dropouts head one half or more of the welfare families and account for one half of the prison population (Educational Testing Service, 1995). In a positive vein, school attainment is associated with better physical health, positive mental health, and greater use of preventive health care (Karoly, 2000; Karoly, Kilburn, Bigelow, Caulkins, & Cannon, 2001; Heckman, 2000).

Given the increasing importance of educational attainment, it is imperative that the factors predicting school completion be identified as fully as possible. This is especially the case for at-risk youth, who due to economic disadvantages and related factors, have significantly lower rates of high school completion and college attendance (U. S. Department of Education, 2002). Identification of the educational and family experiences that can promote children's

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educational persistence and school completion is especially critical for these youth.

In this article, we examined the predictors of high school completion and years of completed education for about 1300 youth in the Chicago Longitudinal Study. This ongoing 20-year prospective investigation tracks the schooling process of a large sample of low-income minority children in the Chicago Public Schools. We addressed two major questions: (a) What are the child, family, and school-related predictors of educational attainment by age 20? (b) How well does the explanatory model account for different measures of educational attainment?

Research on the Predictors of Educational Attainment

Researchers have explored the process of educational attainment for over three decades. Early research focused on individual characteristics of dropouts such as race and socioeconomic status (Cairns, Cairns, & Neckerman, 1989; Ekstrom, Goertz, Pollack, & Rock, 1986; Frank, 1990; Rosenthal, 1998; Rumberger, 1983, 1987). More recently, researchers have given greater attention to macrosystem factors, such as school organization and neighborhood characteristics (Ensminger, Lamkin, & Jacobson, 1996; Lee & Burkam, 2003; Riehl, 1999; Rumberger & Thomas, 2000). We review empirical research on the predictors of educational attainment, including sociodemographic factors, individual factors, early intervention programs, family processes factors, and school-related factors. The outcomes of high school completion and school dropout are emphasized in the review.

Sociodemographic Factors

Most prior research has been focused on sociodemographic factors. Ethnic background, socioeconomic status (SES), and gender have been found to be significantly associated with school failure. School dropout is more likely among Hispanics than among Blacks or Whites (Alexander, Entwisle, & Horsey, 1997; Rumberger, 1987; Rumberger & Larson, 1998; Steinberg, Blinde, & Chan, 1984). Students from the lower socioeconomic strata are more likely to drop out of school than their socioeconomic advantaged peers (Alexander et al., 1997; Cairns et al., 1989; Ensminger & Slursarcick, 1992; Jordan, Lara, & McPartland, 1996; Rosenthal, 1998; Rumberger & Larson, 1998). People who have low SES status are disadvantaged, because low SES status (or poverty) usually accompanies other risks. In addition, research has shown that the processes leading to school failure differ by gender (Cairns et al., 1989; Ensminger & Slursarcick, 1992). Males are more likely to drop out of school than females (Alexander et al., 1997; Ekstrom et al., 1986; Rosenthal, 1998).

Many studies also have indicated that children from single-parent families and step-parent families are more likely to display signs of early disengagement from schools, which affects children's academic achievement (Rumberger & Larson, 1998; Roderick, 1993). In addition, family size is associated with educational attainment because dropouts are more likely to come from large families (Steinberg et al., 1984). Low educational and occupational attainment levels of parents are associated with dropping out (Frank, 1990; Howell & Frese, 1982; Kronick & Hargis, 1990; Roderick, 1993). The potential explanation is that such parents may not be able to provide educational support for their child at home, and they may also be less likely to emphasize school commitment and persistence.

Individual Factors

Although individual factors are personal, they may be affected by experiences, such as school rules, and interactions with teachers and parents. For example, many studies have found that early cognitive ability is associated with later educational attainment (Alexander et al., 1997; Ensminger & Slusarcick, 1992; Kasen, Cohen, & Brook, 1998). Herrnstein and Murray (1994) suggested that low intelligence is one of the best predictors of school failure. Ensminger and Slusarcick's (1992) research showed that academic achievement as early as in the first grade predicted dropping out.

Other individual factors include low self-esteem, negative attitudes toward school, and low educational and occupational aspiration. Research has shown that students who left school early have lower levels of self-esteem than other students (Jordan et al., 1999; Rosenthal, 1998; Rumberger,

1987). Finn and Rock (1997) found that higher levels of self-esteem and a greater sense of control over one's life are both characteristics for low-SES in minority students who succeed in school. However, some research found no difference in self-esteem between dropouts and students who remained in school until graduation (Wehlage & Rutter, 1986). In addition, students who leave school early have more negative attitudes toward school than other students (Alexander et al., 1997; Alexander, Entwisle, & Kabbani, 2001; Fine & Zane, 1989; Rosenthal, 1998; Rumberger, Ghatak, Poulos, Ritter & Dornbusch, 1990; Wehlage & Rutter, 1986). Dropouts also have been found to have lower educational and occupational aspirations than graduates (Rosenthal, 1998; Rumberger & Larson, 1998). However, these results were obtained by comparing dropouts with graduates, so it is hard to know whether dropout was a cause or an effect of individual differences.

Early Intervention Programs

Participation in early childhood intervention is associated with higher educational attainment and lower rates of dropout (Barnett, 1995; Durlak, 1997; Reynolds, Temple, Robertson, & Mann, 2001; Temple, Reynolds, & Miedel, 2000). The positive effects of early intervention programs on school competence and achievement have been reported in many studies (Bryant & Maxwell, 1997; Ensminger & Slusarcick, 1992; Karoly et al., 2001; Ou & Reynolds, 2004; Reynolds, Mann, Miedel, & Smokowski, 1997).

Family Processes

A variety of factors identified related to family process, including parents' involvement, parents' attitudes and values toward educational attainment, child's taking adult roles, and family stressors. Parental involvement in children's education, such as parent participation in school is associated with children's academic achievement and children's decisions to drop out of school (Alexander et al., 2001; McNeal, 1999; Miedel & Reynolds, 1999). Parent's educational expectations for their children are also related to a child's probability of dropping out of school (Alexander et al., 1997). If parents have high expectations for children's educational attainment, children would have greater support for school persistence, and parenting practices would encourage such persistence.

On the other hand, dropping out is associated with children taking adult roles, such as employment due to economic factors, and taking care of other family members (Rosenthal, 1998). Some studies indicate that the cumulative number of family stressors displayed in a household is also related to dropping out (Alexander et al., 1997). Dropout rates are higher for students from families in which the overall level of stress in the household is high. Stressors include financial, health, or child problems.

School-Related Factors

School-related factors, in particular, school experiences and the structure and characteristics of schools were not assessed in detail until the 1980s. School experiences, such as school performance and enrollment are enduring predictors of dropout. Cairnes et al. (1989) reported that school dropouts are characterized by high levels of aggressiveness and low levels of academic performance. Poor academic achievement, absenteeism, early school-behavior problems and problem behaviors in adolescence, less participation in extracurricular activities are found to be significantly associated with dropping out of school (Alexander et al., 1997; Janosz, LeBlanc, Boulerice & Treublay, 1997; Rosenthal, 1998; Rumberger, 1995; Rumberger & Larson, 1998). Also, grade retention is linked to dropout rates positively (Alexander et al., 1997, 2001; McCoy & Reynolds, 1999; Temple, Reynolds & Ou, 2004), although some scholars suggest that grade retention can help raise academic standards (Roderick, Bryk, Jacob, Easton, & Allensworth, 1999). Changing schools was classified as a "family stressor" in some early studies. It has been found to increase the risk of dropping out (Astone & McLanahan, 1991; Jordan et al., 1996; Rumberger & Larson, 1998). Participation in school activity reduces the risk of dropping out for students at high-risk (Davalos, Chavez, & Guardiola, 1999; Mahoney & Cairns, 1997; McNeal, 1995).

Structure of schools is another type of school-related factors. The types of high school youth attend are associated with high school graduation (Bryk & Thum, 1989; Lee & Burkam, 2003; Toles, Schulz, & Rice, 1986). Youth who

attend schools with large proportions of students who have academic difficulties, discipline problems, or are underachievers are more likely to drop out (McNeal, 1997; Rumberger, 1995 Rumberger & Larson, 1998; Wehlage & Rutter, 1986). In contrast, dropout rates are lower in schools where students feel safe, where students report that there is a school spirit, and where students and principals rate teachers are committed (Alspaugh, 1998; Rumberger, 1995). Among other structural factors associated with higher rates of school dropout include enrollment in larger high schools (Alspaugh, 1998; Merritt, 1983; Pittman & Haughwout, 1987), urban and high poverty schools (Rumberger & Larson, 1998), high student/teacher ratios (McNeal, 1997), and discipline policies perceived as "unfair" (Rumberger, 1995).

Research Limitations

Several limitations in the research on educational attainment are evident. Most of the research examined the long-time process of educational attainment over a short period of time. For instance, most research has compared dropouts with graduates, but it is difficult to distinguish whether the differences between dropouts and graduates resulted from the action of dropping out or they existed before the occurrence of dropping out. Therefore, the relationship is unclear when only a short-time period is observed. The links between sociodemographic factors and educational attainment can be distinguished by the time sequence; for example, socioeconomic status occurs before dropping out from high school. Such factors, however, are descriptive, and most of them should be treated as risk factors that impact intervening school experiences rather than as deterministic causes of school dropout. More longitudinal studies would provide insight to understand how various factors associated with individuals affect educational attainment. In addition, most studies have focused on either one or two domains of predictors, most often sociodemographic factors and school performance indicators. Few studies have examined a comprehensive set of predictors that includes the array of individual, family, school, and structural factors. This is especially the case for studies of urban schoolchildren.

Current Study

Using data from the ongoing, 20-year Chicago Longitudinal Study (CLS, 2005), our study is unique in three important respects. First, longitudinal data are used spanning birth to the end of adolescence, which is in contrast to cross-sectional or short-term designs that were employed in most previous studies. Educational attainment is the culmination of learning experiences over two decades. Second, we examined factors related to educational attainment using a comprehensive resilience framework, which includes early and late family-, child-, and school-related factors that have rarely if ever been included together in the same model. This is expected to increase the explanatory power of the model. Finally, the study sample is at risk of school failure because they grew up in high poverty neighborhoods and thus have faced all of the cumulative risks that co-occur with low socioeconomic status. Identification of a wider range of predictors of school completion may contribute to the improvement of educational opportunities for children most in need.

Resilience and Educational Attainment

Our model of educational attainment is based on resilience theory, in particular how to foster educational resilience. The resilience perspective is an increasingly prominent framework for explaining educational success (Masten, 1987; Masten & Coatsworth, 1998; Masten & Garmezy, 1985; Peng, 1994; Wang, Haertel, & Walberg, 1994). A major strength of the resilience framework is that it is consistent with several other conceptual perspectives including the human capital framework (Heckman, 2000), ecological systems theory (Bronfenbrenner & Morris, 1998), and the educational productivity model (Wang et al., 1994). The common principle across these perspectives is that behavioral development is a complex process beginning very early in the life course and is impacted by children's personal resources, the environmental contexts of family, school, and community, and their interactions.

The major tenet of the resilience framework is that psychosocial development from infancy through adolescence and into adulthood is affected by a variety of events, circumstances, and natural strengths and vulner-

abilities of the individual. Certain events and circumstances, such as poverty and a poor home environment, are particularly likely to affect the development adversely. Children exposed to such conditions are believed to be "at risk" for poor developmental outcomes. However, not all children who grow up in a disadvantaged environment will end up with poor outcomes. Some children are able to resist the stress better than others, and they show few or no signs of developmental impairment. These children are identified as "resilient," and the focus is to better understand the factors that may have protected them from impairment.

Consequently, risk factors and protective factors are the key to understanding resilience. Risk factors increase the probability of undesired outcomes. They are of two types: physical risks (genetic risks, such as low intelligence) and environmental risks (stressors as risks, such as poverty). For example, risk factors, such as living in crowded ghetto environment, having many siblings, and low intelligence, were identified to be related to a higher possibility of delinquency and dropping out of school (Masten & Garmezy, 1985). Protective factors facilitate better outcomes in individuals, especially those at high risk such as residing in poverty neighborhoods. Among the protective factors that have been identified are high cognitive ability, high levels of family support and parent monitoring, attendance in high quality schools, and experiencing high levels of social support (Masten, 1994; Masten & Garmezy, 1985; Rutter, 1987).

Because the resilience theory is derived from good adaptation despite adversity, the focus in our study is promoting higher educational attainment among youth at risk of school dropout due to poverty and associated factors. The emphasis is on the protective factors and mechanisms to promote higher educational attainment and prevent school failure. According to the resilience theory, educational attainment is an outcome resulting from interactions among factors, an individual's vulnerability, risk factors, and protective factors. An individual's vulnerability occupies an important position in the process, because it has influences in determining the magnitude of risk and protective factors. When protective mechanisms are activated by protective factors, the difficulties resulted from risk factors might be eased or be overcome.

Resilience informs research on the predictors of educational attainment in several ways. First, individuals differ in vulnerability. Some characteristics, such as low intelligence and low self-esteem, increase the risk of school failure. Second, the presence of risk factors will increase the likelihood of school failure. For example, a person living in poverty or having many siblings might fail school easier than others who do not have these risks do. Multiple/cumulative risk factors can increase the likelihood of dropping out of school greatly. Consequently, a child who is a minority, lives in poverty, and has a large family size will be at higher risk of school failure than a person who is minority but does not have other risk factors. Third, protective factors can reduce negative impacts of risk factors on educational attainment and change a risk trajectory into a protective one. The protective factors could be positive personality disposition, social support system, or a harmonious family environment. A child who has a good extended support system might help him/her through the difficulties, and the protective factor might activate protective mechanisms to change the risk situation into a better outcome. School effectiveness is an example of protective mechanisms. A positive school climate or high teacher expectations can be protective factors in educational development of children at risk (Garmezy, 1991; Rutter, 1979). Thus, the identification of risk and protective factors can lead to effective prevention programs for school failure.

Explanatory Model of the Present Study

An explanatory model of educational attainment is developed based on the findings from previous studies. Using the resilience framework described above, six sets of factors are included in the model hierarchically. Many of these factors have been identified in previous studies of the CLS (Miedel & Reynolds, 1999; Temple & Reynolds, 1999; Temple et al., 2004). Starting with sociodemographic factors, the first set of factors correspond to risk factors in the resilience theory, including gender, race/ethnicity, free lunch eligibility, single-parent family status, teen-parent status, maternal education, and school

neighborhood poverty. The second set of factors is early childhood program participation, corresponded to protective factors. The third set of factors is early adjustment indicators, including kindergarten achievement, classroom adjustment, perceived competence, parent involvement, and early grade retention and special education placement. The fourth set of factors is school commitment factors, including parents' expectation, students' expectation, teachers' expectation, ability level of the class, and days of absence. The fifth set of factors is school-based factors, including school mobility, late grade retention, attendance in magnet schools, special education placement, late academic achievement, and abuse/neglect experiences. The last set of factors is high school experiences, such as type of high school, school location, and juvenile arrest. Except for the sociodemographic factors and early childhood program participation, the other four sets of factors can be viewed as either protective factors or risk factors depending on its direction. If positive behaviors presented, such as high parent involvement, it will be protective factors. If negative behaviors presented, such as low parent involvement, it will be risk factors. The six sets of factors are entered into the model hierarchically and the sequence is chronological. Although the contributions of factors entered later in the model are expected to be substantial, the influence of earlier child and family influences may persist as well as have indirect effects on school completion.

Method

Sample and Data

The study sample participates in the Chicago Longitudinal Study (CLS, 2005), an ongoing investigation of the school adjustment of a panel of low-income minority children growing up in high-poverty neighborhoods in Chicago. The study sample is at risk of school failure due to poverty. The original sample ($N = 1539$) included 989 children who entered the Child-Parent Center (CPC) program in preschool and graduated from kindergarten in 1986 from 20 Centers, and 550 children (comparison group) who participated in alternative government-funded programs in the Chicago Public Schools in 1986 without CPC preschool experience. Because all children in this cohort lived in Title I eligible neighborhoods, they were eligible for and participated in government-funded early childhood programs. Continuously promoted children graduated from high school in 1998.

The sample in the present study included 1286 youth (83.6% of the original sample) for whom status of educational attainment could be determined by September 2000 (mean age = 20.3). Students in and outside of the Chicago Public Schools were located (mostly the former). Data were collected from various sources, such as children, parents, teachers, and school administrative records (Reynolds, 2000).

Table 1 presents characteristics of the original sample, study sample, and attrition sample. The study sample had even gender split, 51% female, and 49% male. About 94% of the sample was Black, 83% were eligible for free lunch, and 75.3% living in school area that income level was 60% or above 60% in poverty. The attrition sample is significantly more likely to be non-Black and have lower scores on family risk status than the study sample. The attrition sample is less likely to be female (46% vs. 51%), has a lower parent unemployment rate (49.4% vs. 57.6%) and a lower rate of eligibility for free lunch (74.2% vs. 83.1%) by participant's age 8. Nevertheless, there are no other significant differences between the study sample and the attrition sample. Attrition analyses were conducted in other studies using the same data set, and selection bias models were tested. The results indicate that there is no selection bias for the attrition samples (Reynolds & Temple, 1995; Temple et al., 2000; Ou & Reynolds, 2006).

Measures

Educational Attainment

Three measures were used: high school completion, high school graduation, and years of completed education. Dropout was not examined because it was assessed in previous reports (Temple & Reynolds, 1999; Temple et al., 2000). Data were obtained from administrative records in all schools youth attended and were supplemented by interviews with family members.

Table 1
Child Characteristics of the Original and Study Samples in the CLS

Characteristics	Original sample ($N = 1539$)	Educational attainment Sample ($N = 1286$)	Attrition Sample ($N = 253$)	p value
Percent girls	50.0	51.0	46.0	.143
Percent Black	93.0	93.6	89.8	.041
Percent mother completed high school by child's birth	48.5	48.5	48.5	1.00
Percent single parent by child's birth	75.1	75.9	71.1	.132
Percent parent were teen (< 18) at child's birth	10.2	9.8	14.0	.146
Percent 4 or more children in household at child's birth	17.5	17.2	18.7	.633
Percent eligible for free lunch by child's age 8	82.1	83.1	74.2	.009
Percent parent unemployment by child's age 8	57.0	57.6	49.4	.167
Percent mother became high school completer between child's birth and age 12	15.0	16.3	7.5	.000
Percent income level is 60% + poverty for school area	76.0	75.3	79.5	.171
Family risk index (0–6)*	2.9	3.1	2.1	.000
ITBS word analysis in K*	63.8	63.7	64.2	.581

*Test statistics are *F* statistics. Others are Pearson chi-square.

High school completion is the official measure of high school attainment status by the National Center of Educational Statistics and the Census Bureau, and has been the common measure used in other studies. This dichotomously coded variable indicated whether youths completed their secondary education with an official diploma or were awarded a General Education Development (GED) credential by September 2000. All others, including those who remained in high school, were coded as noncompleters.

High school graduation was measured through a dichotomous variable. Youths completing high school through traditional graduation were coded 1; otherwise, they were coded 0. Youths who completed high school through GED credentials were coded as dropouts. Some researchers have argued that GED is not different from dropouts (Heckman, 2004). This measure was included in the present study to see if there were differences in the predictors between high school completion and high school graduation.

Years of completed education was coded as a continuous variable, ranging from 7 to 13. College attendance and GED attainment were taken into account in this variable. Obtaining a GED credential was coded 12, and some college was coded 13. The sample size was 1265.

Explanatory Variables

Explanatory variables are described in the following categories: sociodemographic factors, CPC program participation, early adjustment indicators, school commitment factors, school-based factors, and high school experiences.

Sociodemographic factors. Sociodemographic factors included race/ethnicity, gender, birth weight, maternal education, free lunch eligibility, single-parent status, teen-parent status, family size, school poverty, and report of abuse/neglect by age 4. For race/ethnicity, Black children were coded 1, and Hispanic children were coded 0. For gender, females were coded 1; and males were coded 0. Information was obtained from school records for both variables. Birth weight was recoded into a dichotomous variable, low birth weight. If their birth weights were less than 5.5 pounds, they were coded 1 as low birth weight. Otherwise, they were coded 0. Free lunch eligibility at child's age 8 was measured through a dichotomous variable. If they were eligible for free lunch, they were coded 1. Otherwise, they were coded 0. Maternal education was measured through the status of high school completion. If mother completed high school at child's birth, they were coded 1. Otherwise, they were coded 0. For single-parent status, if parents were single parent at child's birth, they were coded 1. Otherwise, they were

coded 0. For family size, if the family had more than four children, they were coded 1. Otherwise, they were coded 0. For teen-parent status, if parents were less than 18 at child's birth, they were coded 1. Otherwise, they were coded 0. Some participants were missing from some factors, and missing values were imputed under the assumption that people with missing values were more disadvantaged. For abuse/neglect experience, if there was any report of abuse/neglect by age 4, they were coded 1. Otherwise, they were coded 0. Finally, a school poverty variable was measured through percent of low-income families in school region, which is a continuous variable.

Scoiodemographic factors were measured dichotomously with the exception of school poverty. Dichotomous variables were used because most of the characteristics are categorical, such as gender, race/ethnicity, free lunch eligibility, single-parent status, and teen-parent status. Dichotomous variables were employed for other factors (birth weight, maternal education, family size, and abuse/neglect) because it is more meaningful to examine the difference between above and below a certain threshold than to examine the difference between a continuous scale, such as if mother completed high school or not, and if they have low birth weight or not. Such thresholds are meaningful because they might have different effects on educational attainment (Rumberger & Larson, 1998; Steinberg et al., 1984; Frank, 1990; Howell & Frese, 1982; Kronick & Hargis, 1990; Roderick, 1993).

CPC program participation. Two program components were measured: preschool and follow-on programs. Participation in the Child-Parent Center (CPC) Preschool Program for one or two years was coded 1; children who did not attend the CPC preschool were coded 0. The data came from school records at time of participation. In the study sample, 65.4% ($n = 841$) participated in the CPC preschool. The program was part-day for 3 hours during the school year and included a summer session. Participation in the CPC follow-on program for 1–3 years was coded 1; children who did not attend the follow-on program were coded 0. 56.8% ($n = 731$) of the study sample participated in follow-on program. This program element was offered in first to third grades in the elementary schools of the CPCs.

Early adjustment indicators. Early cognitive ability skills was measured through the Iowa Test of Basic Skills (ITBS) word analysis at age 6. The word analysis scale contained 35 items evaluating prereading skills, such as letter-sound recognition and rhyming. Internal consistency reliability was .87. Research has confirmed the measure's predictive validity for later achievement (Reynolds, 1991, 2000).

Classroom adjustment between ages 7 and 9 was measured through a scale rated by first to third grade teachers. The scale included six items: "concentrates on work," "follows direction," "is self-confident," "participates in group discussion," "gets along well with others," and "takes responsibility for actions", and they were coded from 1 (*poor/not at all*) to 5 (*excellent/very much*) ($\alpha = .91$). The average score was used. Missing scores were due to teachers' nonresponse and were nonsystematic in the study sample. Missing scores (3.5% of the sample) were imputed with means.

Perceived competence between ages 9 and 12 was measured through a 10- to 12-item scale consisted of student-rated self-concept of task persistence (slightly different from year to year) scale. The items were coded from 1 (*strongly disagree*) to 4 (*strongly agree*). Average of internal consistency of the scale is .75. Examples of the items are like "my classmates like me," "I get along well with others," "I am smart," and "I try hard in school." The measures at different ages are significantly correlated ($r > .30$). Because the scale is slightly different every year, the scores were transformed into z-scores first, and the average score was used. Missing scores (6.8% of the sample) were imputed with means.

Parent involvement between ages 7 and 12 was measured through the frequency of parent participation in school from first through sixth grades as rated by teachers. The total scale ranged from 0 to 6. It was based on the item "parent's participation in school activities" in each of first through sixth grades. The item was rated from (*poor/not at all*) to (*excellent/much*). For the analysis, the frequency of "average or better" ratings (average or better is a score of 3 or higher; Min. = 0, Max. = 5) was used.

Early retention was measured through children's retention experience between first through third grades (ages 7–9). They were coded 1 if they were retained, and were coded 0 if they were never retained. Data came from

administrative records of the Chicago Board of Education. Early special education placement was measured through children's experience of special education placement. They were coded 1 if they had ever been placed in special education between first through third grades (ages 7–9); otherwise they were coded 0. As with retention, data came from school records.

School commitment. Parent expectations was measured through a continuous variable: years of education that parents expected their child had received. This measure is based on the item "How far in school will child get?" from the fourth grade (age 10) parent survey. The scale is as follows, 1 (*grade 8*), 2 (*some high school*), 3 (*completed high school*), 4 (*some college*), 5 (*completed 4-year college*), 6 (*some graduate work*), 7(*completed graduate degree*). If they were missing from the fourth-grade parent survey, the information from second-grade parent survey was used. For those who were missing from both second- and fourth-grade surveys, the same item from eleventh grade was used. The scale was recoded into 4-point scale, 1 (*some high school*), 2 (*completed high school*), 3 (*some college*), and 4 (*completed 4-year college*), and then transformed into years of education using the following codes. One was recoded into 10 years, 2 was recoded into 12 years, 3 was recoded into 14 years, and 4 was recoded into 16 years. Missing values (20% of the sample) were imputed with 14. For the status change of maternal education, if mother became high school completer between child's birth and age 12, they were coded 1 to indicate a positive change for maternal education. Otherwise, they were coded 0.

Student expectations were measured through a dichotomous variable indicating whether students expected to go to college or not. This measure consisted of two items from student survey at fourth (age 10) and tenth grade (age 16): The same question, "How far in school do you think you will get?" was asked, with the following scale, 1 (*grade 8*), 2 (*some high school*), 3 (*high school*), 4 (*college*), and 1 (*some high school*), 2 (*high school graduation*), 3 (*finished vocational or trade school*), 4 (*1 or 2 years of college*), 5 (*4-year degree*), 6 (*master degree*), 7 (*Ph.D., M.D., or equivalent*), respectively, for fourth and tenth grade. The fourth-grade item was used as the main measure. If students were missing from this item, the tenth grade item was used. People with missing values (16% of the sample) were assumed more disadvantaged and were imputed with 0, as not expected to attend college. A dichotomous variable was constructed for student expectations because college attendance is an important level of higher education. It is meaningful to examine the difference between students who expected to attend college and students who did not expected to attend college. A continuous variable, such as years of education, might provide more detail information, but it will not be able to show the difference between students who expected to pass the threshold of completing high school and enter college and those who do not.

Teacher expectations was measured through students rating of the item "My teacher expects me to do well in school?" The scale is as follows, 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), and 4 (*strongly agree*). The same item was repeated from fourth to sixth grades (ages 10–12). Number of years of the item rated highest was used. The range is from 0 to 3. People with missing values (14.9% of the sample) were assumed more disadvantaged and were imputed with 0.

Ability level of child's class was measured through number of years that ability level of the child's class was rated below average by teachers from fourth to sixth grades (ages 10–12). The rating is based on the item "How would you rate the average performance of this child's class?" each year from fourth grade to sixth grade. The scale is as follows, 1 (*among the worst*), 2 (*somewhat better*), 3 (*about average*), 4 (*better than average*), and 5 (*among the best*). Every time they were rated below average, they were counted 1. The range is from 0 to 3. Missing scores (14.3% of the sample) were imputed with 1, which was the value closest to mean (0.65).

Number of days absent per year by age 12 is a continuous variable, ranging from 2 to 17. Data came from three sources: teachers' rating at sixth grade and fifth grade, and parents' rating at fourth grade. Teachers' rating at sixth grade (age 12) is based on the item "Please rate the above named child on numbers of absences during the school year," and the scale is 1 (*0 to 3*), 2 (*4 to 7*), 3 (*8 to 12*), 4 (*13 to 20*), and 5 (*more than 20*). Teachers' rating at fifth grade (age 11) is based on the item "Please rate the above named child regarding attends school",

and the scale is 1 (*poor/not attend at all*), 2 (*below average/some*), 3 (*average/satisfactory*), 4 (*above average/good*), and 5 (*excellent/much*). This item was reverse recoded, 1(*excellent/much*) and 5 (*poor/not attend at all*). Parents' rating at fourth grade is based on the item, "How often does your child stay home from school?", and the scale is 1 (*never*), 2 (*once a month*), 3 (*once a week*), 4 (*2 or 3 times a week*), and 5 (*nearly everyday*). The scale was recoded into 1 (*never*), 3 (*once a month*), 4 (*once a week*), 5 (*2 or 3 times a week or nearly everyday*). The average rating of fifth and sixth grades by teachers was used. If they were missing from both teacher ratings, the parents' rating was used. The composite measure ranges from 1 to 5. It was then recoded into days of absence according to the following rules: 1 equals 2 days, 1.5 to 2 equals 6 days, 2.5 to 3 equals 10 days, and above 3 equals 17 days. If participants had missing values (15% of the sample), they were assigned 10.

School-based factors. Percent of students above grade level in reading was a school-level variable based on school record, and the range was from 4 to 92.1. Students who attended the same school have the same value. Schools with missing scores (10.7%% of the sample) were imputed with medians.

School mobility was measured through three dichotomous variables: moved once, moved twice, and moved three times or more. The data were obtained from a grade-by-grade analysis of school system records. Late grade retention was measured from fourth through eighth grades. They were coded 1 if they were ever retained during the time period, and they were coded 0 if they were never retained (continuously promoted). Late special education placement was measured from fourth through eighth grades as well. If they had ever been placed in special education during the time period, they were coded 1; otherwise they were coded 0. Attendance of magnet school from fourth through eighth grades (ages 10–14) was measured through a dichotomous variable. Children who had ever attended magnet school from fourth through eighth grades were coded 1; otherwise, they were coded 0. Late school achievement was measured through Iowa Test of Basic Skills (ITBS) reading scores at age 14. The reading test contained 58 items and emphasized understanding of text passages. The reliability was .92. For abuse/neglect experience, if participants had any report of abuse/neglect between ages 4 and 17, they were coded 1; otherwise, they were coded 0.

High school experiences. Attendance of various types of high school is measured through three dichotomous variables: attendance of magnet school, career academy school, and technical school. Attendance of a Chicago nonpublic high school is measured through a binary variable. If they attended a Chicago nonpublic high school, they were coded 1. Otherwise, they were coded 0. For school location, if they attended a high school outside of Chicago, they were coded 1. Otherwise, they were coded 0. For juvenile arrest experience, if participants had any juvenile arrest by age 18, they were coded 1; otherwise, they were coded 0.

Missing index. Because missing values were imputed for various variables, a missing index was created. The variables that had missing values include maternal education, free lunch eligibility, single parent status, family size, low birth weight, ITBS word analysis in kindergarten, classroom adjustment, perceived competence, ability level of child's class, parent expectation, student expectation, teacher expectation, school mobility, days of absence, school quality at fifth grade, ITBS reading at age 14, and high school types. If they were missing for five or more variables, they were coded 1 for the missing index. Otherwise, they were coded 0. The missing index was included in the block of sociodemographic factors because it was the first block that variables had missing values.

Table 2 provides the valid sample sizes and means for study variables. Appendix 1 and 2 provides the intercorrelations among outcomes and explanatory variables.

Data Analysis

Multiple linear regression was used to analyze years of completed education, and logistic regression was used to analyze the dichotomous dependent variables-high school completion and graduation. Explanatory variables were entered hierarchically, following the sequence described earlier: sociodemographic factors, CPC program participation, early adjustment indicators, school commitment, intervening school-based factors, and high school experiences. The set of school-based factors were entered in two steps: ITBS reading scores at age 14 and report

Table 2
Description of Key Variables

Variables	*N*	*M* (%)	*SD*
Sociodemographic factors			
Race	1,286	93.6	.25
Sex	1,286	51.0	.50
Eligible for free lunch at child's age 8	1,249	83.1	.38
Mother completed HS at child's birth	1,250	48.5	.50
Single parent status at child's birth	1,231	75.9	.43
If had more than 4 children at child's birth	1,231	17.2	.38
If mother became HS completer between age 0 and 12	1,250	16.3	.37
Teen parents (< 18 years)	1,136	9.8	.30
Ever reported abuse/neglect by age 4 (court)	1,286	1.2	.11
Low birth weight (less than 5.5 pounds)	1,231	11.7	.32
Percent of low-income families in school region	1,286	66.59	9.60
If missing 5 or more variables	1,286	10.2	.30
CPC program participation			
Preschool participation	1,286	65.4	.48
Follow-on participation	1,286	57.0	.50
Early adjustment indicators			
ITBS Word analysis (age 6)	1,282	63.67	13.36
Classroom adjustment (ages 7–9)	1,241	19.09	4.78
Perceived competence (ages 9–12)	1,198	.02	.99
Parent Involvement (ages 7–12)	1,286	2	1.52
Ever retained (ages 7–9)	1,286	19.6	.40
Ever in special education (ages 7–9)	1,286	8.6	.28
School commitment			
Parent expectation for kids education (years) (ages 10–17)	1,029	14.32	1.71
Ability level of class rating below average (ages 10–12)	1,102	.65	.76
If student expect to go to college	1,076	81.0	.39
Teacher's expectation (ages 10–12)	1,094	1.62	.86
Days of absence per year by age 12	1,090	7.2	5.01
Intervening school-based factors			
Percent above grade level in reading of the school (age 11)	1,149	18.11	13.92
If moved once (ages 10–14)	1,235	33.0	.47
If moved twice (ages 10–14)	1,235	15.6	.36
If moved three times or more (ages 10–14)	1,235	9.3	.29
Ever retained (ages 10–14)	1,286	9.2	.29
Ever in special education (ages 10–14)	1,286	13.7	.34
If ever enrollment in magnet schools (ages 10–14)	1,286	10.6	.31
ITBS reading scores (age 14)	1,221	144.68	22.14
Any child abuse/neglect (ages 4–17)	1,286	12.8	.33
High school experiences			
If attend magnet school (ages 15–18)	1,286	13.1	.34
If attend career academy school (ages 15–18)	1,286	20.5	.40
If attend technical school (ages 15–18)	1,286	1.9	.14
Attended a Chicago Non public high school	1,286	3.0	.17
Attended high school outside of Chicago	1,286	9.0	.29
Any juvenile arrest by age 18	1,286	20.1	.40
Outcome measures			
Years of completed education	1,265	10.97	1.85
High school completion	1,286	52.6	.50
High school graduation	1,286	49.1	.50

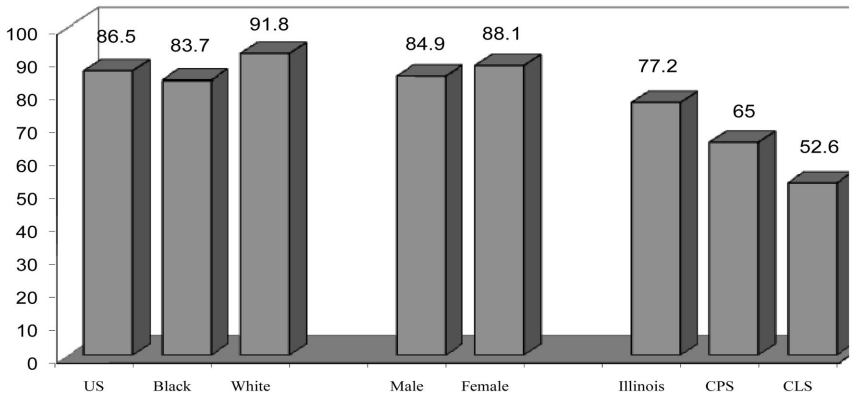

Figure 1. High school completion rates for selected groups, 2000.
Note. U.S. High school completion rates (U.S. Department of Education, 2001) are for October 2000. HS completion rates are the proportion of 18- through 24-year-olds who have graduated from high school. Chicago rate (Allensworth, 2005) is for 1998. CLS rate is for September 2000. CPS and CLS data are cohort rates.

of abuse/neglect by age 17 were entered separately with other factors included in this set because the two factors were believed to be significantly associated with educational attainment. The set of high school experiences was also entered in two steps: juvenile arrest was entered lastly separately from other factors in this set due to the significance of juvenile arrest.

The sequence was determined based on the timing of the measures. The final model included all explanatory variables. Statistical Package for the Social Sciences (SPSS) 14.0 was used to conduct the analyses. Collinearity among explanatory variables was examined, and the results indicated that it did not affect coefficient estimates and their standard errors.[1]

The coefficients for predictors in logistic regression analysis are presented in odds ratios. An odds ratio is the odds of being in a group (outcome) for a particular value of the predictor, divided by the odds for the predictor value that is one unit lower. In other words, an odds ratio indicates the amount the odds of being in a group are multiplied when the predictor (independent variable) is incremented by a value of one unit (Cohen, Cohen, West, & Aiken, 2003). Odds ratios greater than 1 indicate positive regression coefficients and reflect the increase in odds of being in the group (outcome) associated with each unit increase in the predictor (independent variable). Odds ratios less than 1 indicate negative regression coefficients and reflect the decrease in odds of being in the group (outcome) associated with each unit increase in the predictor (independent variable). For example, if the odds ratio on high school completion for whether students expecting to go to college or not (dichotomous variable) is 2.2, it indicates if students expect to go to college, then they are 2.2 times more likely to complete high school than the students did not expect to go to college.

Results

In the study sample, the range of years of completed education is 7 to 13, and the average years of completed education is 10.97. Over 50% of the sample ($n = 676$) completed high school by age 20, and 47.4% ($n = 610$) did not complete high school. The high school completion rate of the study sample is lower than other samples, such as the rates for Black and Chicago public schools. Figure 1 presents the high school completion rates for selected groups. CLS has a lower rate than other groups. Among the 52.6% who completed high school, 6.6%

[1] Variance inflation factor (VIF) was used to examine the degree of multicollinearity. A rule of thumb is that any VIF of 10 or more provides evidence of serious multicollinearity involving the corresponding independent variables (Cohen, Cohen, West, & Aiken, 2003). The VIFs of the explanatory variables range from 1.029 (report any child abuse/neglect by age 4) to 2.052 (ITBS reading scores at age 14).

($n = 45$) completed through GED, and 93.4% ($n = 638$) graduated from high school.

The final model explained 30% of variance of years of completed education. Overall, the model predicted accurately 73.3% of youths' observed high school completion status, and 72.6% of high school graduation status.

Years of Completed Education

Table 3 shows the estimates from the hierarchal regression analysis. The r squared increases as each block of variables was added into the model. Except for Model 2 (entered CPC program participation), Model 5 (entered school-based factors), and Model 7 (entered high school experiences), each set of predictors improved the model significantly at .05 level. Race, gender, free lunch eligibility, and maternal education, were significantly associated with years of completed education from Model 1 to Model 4. Free lunch eligibility became not significant when school-based factors were entered in Model 5. Gender became not significant when juvenile arrest was entered in the last model. Among early adjustment indicators, word analysis in kindergarten, classroom adjustment, perceived competence, and parent involvement, were significant factors when they were entered into Model 3 the first time. As more factors were entered into the model, only parent involvement and placement in special education remain significant in all models.

The results of the final model with all variables included are described below. Significant factors in the final model influence educational attainment above and beyond the influence of other included variables. Among sociodemographic factors, race (i.e., Black, $b = -.470$, $p < .05$) and mother's education at child's birth ($b = .411$, $p < .01$) were significantly associated with years of completed education. The finding for mother's education indicates that controlling for other factors children whose mother completed high school completed, on average, one third more years of education than children whose mother was a school dropout.

Among early adjustment indicators, parent involvement ($b = .097$, $p < .01$), and special education placement (ages 7–9) ($b = .402$, $p < .05$) were significantly associated with years of completed education. The coefficient for parent involvement indicates that each additional year of average or better involvement is associated with a .1 year increase in educational attainment.

Among school commitment variables, children's expectation of attending college ($b = .518$, $p < .01$) was significantly associated with more years of education, and days of absence ($b = -.055$, $p < .01$) was associated with fewer years of education. Among intervening school-based factors, two school moves ($b = -.384$, $p < .01$), three or more school moves ($b = -.661$, $p < .01$), and grade retention between ages 10 and 14 ($b = -.357$, $p < .01$), were associated with fewer years of completed education.

Finally, attendance in a magnet high school ($b = .473$, $p < .01$) was associated with more years of education. Juvenile arrest was associated ($b = -.938$, $p < .01$) with about a one year lower mean level of school completion.

We also calculated effect sizes for the predictors in standard deviations (*SD*) using Cohen's d index (1988). Generally, an effect size of .2 indicates a small effect; .5 indicates a medium effect, and .8 indicates a large effect.

Juvenile arrest, which was associated with an average decrease of 1 year of education, had an effect size of .51 *SD*. This was the largest of predictor set. A decrease of 10 absences (e.g., from 15 to 5) per year was associated with an effect size of .30 *SD*. Children's expectations to attend college had an effect size of .28 *SD*. Compared to no mobility, two school moves was associated with an effect size of .21, and three or more moves with an effect size of .36. Attendance in a magnet high school was associated with an effect size of .26 *SD*. Grade retention had an effect size of .19 *SD*. Finally, a relatively modest increase of 3 units in parent involvement (from 1 to 3 years out of 6 of average or better school involvement) was associated with an effect size of .15 *SD*. Overall, findings indicate that many predictors had practically significant effects on educational attainment.

High School Completion

Table 4 presents the logistic regression result. The final model correctly predicted 78.3% of high school completers and 67.7% of noncompleters. The result for high school completion is similar to years of completed education. Find-

Table 3
Unstandardized Coefficients (B) of Model Predicting Age 20 Years of Completed Education

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Sociodemographic factors								
Race (1 = black)	−.623**	−.635**	−.469*	−.505*	−.487*	−.459*	−.521*	−.470*
Sex (1 = girls)	.611**	.596**	.363**	.271**	.220*	.229*	.203*	−.007
Eligible for free lunch (1 = yes)	−.496**	−.499**	−.355**	−.279*	−.236	−.222	−.198	−.147
Mother completed HS at child's birth	.670**	.647**	.492**	.455**	.403**	.393**	.405**	.411**
Single parent status at child's birth	−.207	−.216	−.152	−.095	−.052	−.040	−.023	.005
If had more than 4 children in household at child's birth	−.185	−.176	−.119	−.058	−.075	−.080	−.080	−.046
Teen parents (< 18 years)	.095	.085	−.009	.144	.056	.060	.079	.074
Ever reported abuse/neglect by age 4 (court)	−.407	−.413	−.392	−.282	.056	.060	.079	.074
Low birth weight	−.094	−.076	.055	.089	.070	.087	.051	.031
Percent low-income families in school region	.004	.004	.007	.006	.006	.006	.008	.008
If missing 5 or more variables	−.371	−.358*	−.160	.162	.175	.178	.209	.230
CPC program participation								
Preschool participation (1 = yes)		.226	.115	.104	.043	.033	−.019	−.032
Follow-on participation (1 = yes)		.040	−.155	−.168	−.229*	−.218*	−.224*	−.172
Early adjustment indicators								
Word analysis (age 6)			.010*	.007	.005	.004	.005	.004
Classroom adjustment (ages 7–9)			.048**	.031*	.029*	.025	.026	.026
Perceived competence (ages 9–12)			.249**	.197**	.164*	.145*	.130	.109
Parent Involvement (ages 7–12)			.177**	.140**	.123**	.115**	.102**	.097**
Ever retained (ages 7–9)			−.137	−.134	−.138	−.093	−.085	−.060
Ever in special education (ages 7–9)			.398*	.451**	.444*	.443*	.425*	.402*
School commitment								
Parent expectation for kids education (years)				.066*	.053	.048	.044	.040
If mother became a HS completer between child's age 0 and 12				.144	.072	.058	.091	.121
If ability of class ever rating below average (1 = yes)				−.056	−.026	−.016	−.010	−.015
If student expect to go to college (1 = yes)				.644**	.597**	.591**	.579**	.518**
Teacher's expectation are high (from students)				−.101	−.117	.112	−.106	.088
Days of absence by age 12				−.064**	−.060**	−.058**	−.056**	−.055**
Intervening school-based factors								
Percent above grade level in reading of the school (age 11)					.001	.000	.001	.001

Table 3 (*continued*)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
If moved once (ages 10–14) (1 = yes)					−.216	−.206	−.218	−.183
If moved twice (ages 10–14) (1 = yes)					−.389**	−.380**	−.425**	−.384**
If moved three times or more (ages 10–14) (1 = yes)					−.755**	−.725**	−.753**	−.661**
Ever retained (ages 10–14) (1 = yes)					−.428*	−.380*	−.362*	−.357*
Ever in special education (ages 10–14) (1 = yes)					−.087	−.045	−.035	.008
If ever enrollment in magnets (ages 10–14) (1 = yes)					.317	.302	.263	.247
ITBS reading scores (age 14)						.004	.004	.003
Any child abuse/neglect (ages 4–17)						−.215	−.215	−.082
High school experiences								
If attend magnet school (ages 15–18) (1 = yes)							.496**	.473**
If attend career academy school (ages 15–18)							.196	.195
If attend technical school (ages 15–18)							.147	.070
Attended a Chicago nonpublic high school (1 = yes)							.380	.337
Attended high school outside of Chicago (1 = yes)							.187	.125
Any juvenile arrest by age 18								−.938**
Constant	11.303	11.141	9.060	8.910	9.544	9.083	8.993	9.283
R Square	.084	.091	.182	.236	.258	.261	.270	.304
Number of cases	1265	1265	1265	1265	1265	1265	1265	1265

* $p < .05$. ** $p < .01$.

Table 4
Logistic Regression Odds Ratio of Model Predicting Age 20 High School Completion (N = 1,286)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Sociodemographic factors								
Race (1 = black)	.48**	.47**	.55*	.51*	.52*	.55*	.54*	.58
Sex (1 = girls)	2.08**	2.05**	1.65**	1.52**	1.43**	1.46**	1.43**	1.07
Eligible for free Lunch (1 = yes)	.61**	.61**	.69*	.74	.77	.79	.81	.86
Mother completed HS at child's birth	2.01**	1.97**	1.75**	1.80**	1.70**	1.66**	1.68**	1.71**
Single parent status at child's birth	.72*	.72*	.75	.79	.83	.84	.85	.88
If had more than 4 children in household at child's birth	.74	.75	.78	.83	.82	.81	.80	.83
Teen parents (< 18 years)	1.18	1.17	1.06	.99	1.10	1.11	1.12	1.12
Ever reported abuse/neglect by age 4 (court)	.66	.65	.67	.74	.74	.73	.77	.71
Low birth weight	.81	.83	.94	.99	.96	.99	.96	.91
Percent of low-income families in school region	1.00	1.00	1.01	1.01	1.01	1.01	1.01	1.00
If missing 5 or more variables	.71	.72	.91	1.48	1.48	1.50	1.59	1.68
CPC program participation								
Preschool participation (1 = yes)		1.27	1.13	1.14	1.07	1.05	1.03	.96
Follow-on participation (1 = yes)		1.05	.87	.83	.77	.79	.79	.84
Early adjustment indicators								
Word analysis (age 6)			1.01	1.00	1.00	1.00	1.00	1.00
Classroom adjustment (ages 7–9)			1.07**	1.05**	1.05*	1.04	1.04	1.04*
Perceived competence (ages 9–12)			1.22*	1.14	1.10	1.05	1.03	1.00
Parent involvement (ages 7–12)			1.21**	1.16**	1.15**	1.12*	1.11*	1.10
Ever retained (ages 7–9)			.82	.81	.80	.88	.89	.90
Ever in special education (ages 7–9)			1.35	1.49	1.49	1.48	1.45	1.47
School commitment								
Parent expectation for kids education (years)				1.08	1.06	1.05	1.05	1.04
If mother became a HS completer between child's age 0 and 12				1.38	1.28	1.25	1.26	1.33
If ability of class ever rating below average (1 = yes)				.88	.91	.94	.94	.92
If student expect to go to college (1 = yes)				2.27**	2.19**	2.16**	2.13**	2.07**
Teacher's expectation are high (from students)				.91	.90	.91	.92	.94
Days of absence by age 12				.93**	.93**	.93**	.93**	.93**
Intervening school-based factors								
Percent above grade level in reading of the school (age 11)					1.00	1.00	1.00	1.00
If moved once (ages 10–14) (1 = yes)					.83	.84	.84	.89

Table 4 (*continued*)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
If moved twice (ages 10–14) (1 = yes)					.63*	.65*	.62*	.63*
If moved three times or more (ages 10–14) (1 = yes)					.46**	.48**	.48**	.52*
Ever retained (ages 10–14) (1 = yes)					.53*	.59*	.60*	.59*
Ever in special education (ages 10–14) (1 = yes)					.90	.99	.99	1.08
If ever enrollment in magnets (ages 10–14) (1 = yes)					1.78*	1.73	1.66	1.59
ITBS reading scores (age 14)						1.01*	1.01*	1.01
Any child abuse/neglect (ages 4–17)						.67	.69*	.80
High school experiences								
If attend magnet school (ages 15–18) (1 = yes)							1.59*	1.55*
If attend career academy school (ages 15–18)							1.17	1.18
If attend technical school (ages 15–18)							1.34	1.13
Attended a Chicago Non public high school (1 = yes)							1.84	1.74
Attended high school outside of Chicago (1 = yes)							.90	.84
Any juvenile arrest by age 18								.25**
−2 log likelihood	1671.56	1667.05	1570.46	1492.67	1462.88	1454.16	1446.60	1388.57
Cox & Snell *R* Square	.080	.084	.150	.200	.218	.223	.228	.262
Percent correct of high school completion	69.2	68.0	72.6	72.8	73.7	74.7	75.1	78.3
Overall percent correct	60.5	60.8	67.9	70.0	70.2	70.6	71.1	73.3

* $p < .05$. ** $p < .01$.

ings from the final model were described. Among sociodemographic factors, mother completed high school at child's birth (odds ratio [OR] = 1.71; 95% confidence interval [CI] = 1.26, 2.33) was significantly associated with a higher rate of high school completion.

Among early adjustment indicators, classroom adjustment (OR = 1.04; 95% CI = 1.00, 1.08) was significantly associated with a higher rate of high school completion. This indicates that a 1-point increase on classroom adjustment (scale range from 6 to 30) increased the log-odds of school completion by 4%. A 4-point increase in adjustment increases the log-odds of completion by 16%. For school commitment, students' expectation to go to college was associated with a twofold increase in the probability of completing high school (OR = 2.07; 95% CI = 1.52, 2.81). Each additional day absent from school in the elementary grades was associated with a 7% lower odds or probability of completing high school (OR = .93; 95% CI = .90, .96). For example, an increase from 5 to 10 absences per year reduces the odds of school completion by 35%.

Among intervening school-based factors, two school moves (OR = .63; 95% CI = .42, .95), three or more school moves (OR = .52; 95% CI = .30, .89), and grade retention (OR = .59; 95% CI = .36, .98) were significantly associated with a lower rate of high school completion. These findings indicate that mobility and grade retention reduce the probability of school completion by nearly one half. Finally, attendance in a magnet high school (OR = 1.55; 95% CI = 1.03, 2.34) was associated with 55% increase in the probability of school completion, and juvenile arrest (OR = .25; 95% CI = .17, .36) was associated with about a 75% reduction in the probability of school completion.

High School Graduation

Overall, the pattern of the findings for high school graduation was similar to high school completion. Table 5 presents the logistic regression results. The final model correctly predicted 74.3% of high school graduates and 70.8% of nongraduates. Findings from the final model were described. Among sociodemographic factors, maternal high school completion as compared dropout was associated with a 70% increase in the odds of high school graduation (OR = 1.70; 95% CI = 1.25, 2.32).

For school commitment, students' expectation of attending college was associated with approximately a twofold increase in the probability of graduation above and beyond the influence of other predictors (OR = 1.89; 95% CI = 1.38, 2.60). Each additional day absent from school per year was associated with a 7% decrease in the likelihood of high school graduation (OR = .93; 95% CI = .90, 95).

Among school-based factors, two school moves (OR = .58; 95% CI = .39, .88) and three or more school moves (OR = .42; 95% CI = .24, .75) substantially reduced the likelihood of high school graduation by about half relative to students who were school-stable. Relative to continuously promoted students, those retained between fourth and eighth grades had a 52% lower probability of graduation (OR = .48; 95% CI = .28, .82).

Finally, relative to attendance in neighborhood schools, attendance in a magnet high school was associated with about a 60% increased probability of graduation (OR = 1.61; 95% CI = 1.07, 2.41). In contrast and relative to no arrest history, juvenile arrest was associated with an 80% lower probability of graduation (OR = .20; 95% CI = .13, .30).

To sum up, the common predictors across all three attainment outcomes were maternal education, student's expectation to attend college, number of absences, later grade retention, attendance in a magnet high school, and juvenile arrest. Parent involvement was a predictor of years of completed education but not for high school completion or graduation. Teacher ratings of classroom adjustment were a significant predictor only for high school completion.

Additional Analyses

Gender subgroups also were examined. The final model explained 29% of variance of years of completed education for females and 36% of variance for males. The final model also correctly predicted 83.7% of high school completion for females and 71.5% for males. The significant predictors for female were similar to those of the whole sample. There were fewer significant predictors for males. Teen-parent status, students' expectation of attending college, days of absence, school mobility, atten-

Table 5
Logistic Regression Odds Ratio of Model Predicting Age 20 High School Graduation (N = 1,286)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Sociodemographic factors								
Race (1 = black)	.51**	.51**	.59*	.55*	.56*	.59	.57	.62
Sex (1 = girls)	2.07**	2.05**	1.66**	1.53**	1.44**	1.47**	1.43**	1.04
Eligible for free Lunch (1 = yes)	.60**	.59**	.67*	.72	.76	.78	.80	.85
Mother completed HS at child's birth	2.03**	2.00**	1.79**	1.80**	1.68**	1.65**	1.66**	1.70**
Single parent status at child's birth	.70*	.69*	.72*	.77	.82	.83	.84	.87
If had more than 4 children in household at child's birth	.72	.73	.77	.82	.81	.80	.79	.82
Teen parents (< 18 years)	1.24	1.24	1.13	1.06	1.21	1.22	1.24	1.24
Ever reported abuse/neglect by age 4 (court)	.77	.77	.78	.87	.88	.87	.91	.84
Low birth weight	.84	.86	.98	1.03	.88	.87	.91	.94
Percent of low-income families in school region	1.00	1.00	1.01	1.01	1.01	1.01	1.01	1.01
If missing 5 or more variables	.69	.69	.88	1.36	1.36	1.38	1.45	1.52
CPC program participation								
Preschool participation (1 = yes)		1.25	1.12	1.13	1.04	1.03	1.01	.94
Follow-on participation (1 = yes)		.99	.81	.77	.71*	.73*	.72*	.77
Early adjustment indicators								
Word analysis (age 6)			1.01	1.01	1.00	1.00	1.00	1.00
Classroom adjustment (ages 7–9)			1.06**	1.04*	1.04*	1.03	1.04	1.04
Perceived competence (ages 9–12)			1.29**	1.22*	1.18	1.13	1.12	1.08
Parent involvement (ages 7–12)			1.22**	1.18**	1.15**	1.13*	1.12*	1.11
Ever retained (ages 7–9)			.85	.85	.83	.90	.91	.93
Ever in special education (ages 7–9)			1.55	1.70*	1.56	1.56	1.54	1.58
School commitment								
Parent expectation for kids education (years)				1.09*	1.08	1.07	1.06	1.06
If mother became a HS completer between child's age 0 and 12				1.30	1.18	1.15	1.18	1.24
If ability of class ever rating below average (1 = yes)				.91	.96	.98	.99	.97
If student expect to go to college (1 = yes)				2.11**	2.01**	1.98**	1.96**	1.89**
Teacher's expectation are high (from students)				.88	.86	.87	.88	.90
Days of absence by age 12				.92**	.92**	.93**	.93**	.93**
Intervening school-based factors								
Percent above grade level in reading of the school (age 11)					1.01	1.00	1.00	1.00

(*table continues*)

Table 5 (*continued*)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
If moved once (ages 10–14) (1 = yes)					.80	.81	.80	.85
If moved twice (ages 10–14) (1 = yes)					.59**	.60*	.57**	.58**
If moved three times or more (ages 10–14) (1 = yes)					.40**	.41**	.40**	.42**
Ever retained (ages 10–14) (1 = yes)					.44**	.48**	.49**	.48**
Ever in special education (ages 10–14) (1 = yes)					1.04	1.13	1.14	1.27
If ever enrollment in magnets (ages 10–14) (1 = yes)					1.64	1.60	1.52	1.44
ITBS reading scores (age 14)						1.01**	1.01	1.01
Any child abuse/neglect (ages 4–17)						.70	.70	.86
High school experiences								
If attend magnet school (ages 15–18) (1 = yes)							1.64*	1.61*
If attend career academy school (ages 15–18)							1.24	1.24
If attend technical school (ages 15–18)							1.20	1.00
Attended a Chicago Non public high school (1 = yes)							1.83	1.71
Attended high school outside of Chicago (1 = yes)							1.08	1.02
Any juvenile arrest by age 18								.20**
−2 log likelihood	1672.21	1669.11	1567.32	1493.56	1455.36	1447.99	1439.46	1369.49
Cox & Snell *R* Square	.082	.084	.154	.201	.23	.229	.234	.275
Percent correct of high school completion	55.2	55.2	65.9	69.4	69.4	70.5	71.2	74.3
Overall percent correct	62.4	62.6	66.7	70.1	70.2	70.6	70.5	72.6

* $p < .05$. ** $p < .01$.

dance of magnet high school, and juvenile arrest were consistently significant for both males and females. Although teen-parent status was significant for both males and females, the associations were in different directions. It was negatively associated with years of completed education (and high school completion) for females, but it was positively associated with years of completed education (and high school completion) for males. Classroom adjustment and perceived competence were significant for males, but not for females. Parent involvement and parent's expectation were significant for females, but not for males. The findings shed light on different predictors for males and females. The data was also analyzed without replacing the missing values. The results indicate a similar pattern with the findings with imputed missing values.[2]

Several alternative sociodemographic measures were examined to test the robustness of the findings. The results of these analyses indicate that the findings are robust. First, changes in family socioeconomic status, such as changes between child's birth and age 12 on 4 or more children in the household, single-parent status, and free lunch eligibility, were added into the model as part of the sociodemographic factors. None of those additional variables were significant, and the pattern of the results stayed the same. Second, parent's employment status at children's age 8 was added into the model, and it also did not significantly contribute. The results had the same pattern as the models reported earlier. Third, instead of a binary variable, a continuous variable was used for mother's education (years of schooling) at child's birth in the alternative models. The variable was not significantly associated with the outcomes, and the pattern of the results stayed the same. Finally, family-risk status index was used instead of individual indicators of sociodemographic measures, such as mother's education, free lunch eligibility, single-parent status, four or more children in the household, and school neighborhood poverty. The results are similar. Although the composite family risk status index provides a different way of examining effect of socioeconomic factors, it cannot provide information regarding what individual indicators among the composite index have more impact on the outcomes. Nevertheless, the similar pattern of the results for these different model specifications increases confidence in the findings.

Discussion

Rather than investigating the impact of only a few predictors of educational attainment, this study tested a comprehensive model that incorporated family background, child, family, and school-related predictors identified in previous research but never tested in the same model. The extensive longitudinal design used in the Chicago Longitudinal Study also was a major strength since data from multiple sources were used from children's birth to the high school years.

Our findings indicated that two major predictors were associated with higher levels of educational attainment: youth expectations of educational attainment and attendance in selective magnet high schools. Youth expectations for educational attainment by age 15 were associated with higher educational attainment, which is consistent with many previous studies (Ekstrom et al., 1986; Fine, 1991; Worrell & Hale, 2001). The strength of our study is that expectations predicted educational attainment even after many other predictors were taken into account, predictors that are not usually tested.

Our finding that enrollment in a magnet high school is associated with higher educational attainment indicates that school quality is a major

[2] Some coefficients from the analyses without replacing the missing values are provided here. First is the result on years of completed education. Mother completed high school at child's birth ($b = .521$, $p < .01$) was significantly associated with more years of completed education. Among school commitment variables, days of absence ($b = -.064$, $p < .01$) was associated with fewer years of completed education. Among high school experiences, attendance of magnet high school ($b = .356$, $p < .05$) was significantly associated with more years of completed education, and juvenile arrest by age 18 ($b = -1.065$, $p < .01$) was associated with fewer years of completed education. Second is the result on high school completion. Mother completed high school at child's birth (odds ratio [OR] = 2.34; 95% confidence interval [CI] = 1.55, 3.52) were significantly associated with a lower rate of high school completion. Among school commitment variables, days of absence (OR = .92; 95% CI = .89, .96) was significantly associated with a lower rate of high school completion. Juvenile arrest by age 18 (OR = .21; 95% CI = .12, .38) were associated with a lower rate of high school completion. The pattern of the results for high school graduation is similar to that of high school completion.

contributor to educational success. Although it is possible that the influence of magnet school attendance is due in part to unmeasured student or family factors, our model included achievement test scores prior to magnet school enrollment and many other measures tapping preexisting differences between youth who attended lower versus higher quality high schools. More importantly, how enrollment in such schools led to higher educational attainment warrants attention. Is it a peer effect since magnet schools are likely to have a greater concentration of students that value education and plan to go farther in school? Or do such schools have more positive climates and devote greater amounts of time to instruction at a higher level of quality? A combination of these factors is likely to be present.

Alternatively, our findings revealed that four other predictors linked to significantly lower levels of educational attainment: school absences, grade retention in the elementary grades, frequent school mobility by eighth grade, and juvenile arrest. Among these, school mobility has been the least tested in previous studies because most research has found that mobility links to lower school achievement (Temple & Reynolds, 1999). Of course, on the basis of this research, the link between frequent mobility and lower levels of educational attainment is not surprising.

The findings on grade retention, especially retention between fourth and eighth grades, are consistent with much previous research (Alexander, Entwisle, & Dauber, 2003; Temple et al., 2004). The experience of grade retention could depress self-esteem and trigger a set of school experiences and adult expectations that lead to an increased risk of dropout. These and other potential mechanisms, including changes to peer relations or school quality, need further investigation.

Juvenile arrest had the largest impact on all three measures of educational attainment. Youth with an official court petition had about an 80% lower likelihood of completing high school than those who had no arrest history even after the influence of many other predictors were taken into account. Although this finding is not surprising given the frequent cooccurrence of school disengagement with problem behaviors, it does suggest that predictors impacting educational attainment directly or indirectly may also contribute to delinquency prevention. Early childhood interventions that increase educational attainment, for example, also have been shown to reduce rates of delinquency and crime (Garces, Thomas, & Currie, 2002; Reynolds et al., 2001; Schweinhart et al., 2005). Interventions that promote school engagement and commitment also may affect both school persistence and delinquency prevention (Sinclair, Christenson, & Thurlow, 2005). Of course, the relation between delinquency and school completion is complex and may be reciprocal for at least some youth even though the average age of juvenile arrest precedes that of school dropout.

Although previous studies have found that school achievement is a significant predictor of school completion, our measures of achievement—kindergarten word analysis scores and reading comprehension scores at age 14—were often but not always significant predictors. Both were usually significant in reduced form models, but they lost much of their significance in the full models. There are two explanations for this pattern of effects. The achievement measures were moderately to highly correlated with other school experiences that also measure performance, grade retention, and school absences. In addition, the large number of predictors in the model made it difficult for any one factor to show added value. Thus, it is possible we overcontrolled for school performance in our model.

Consistent with many prior studies (Alexander et al., 2001; Entwisle, Alexander, & Olson, 2005; Wilson, 1987), we found that the sociodemographic factors of race/ethnicity, SES, residence in a single-parent family, and parent education were significantly associated with educational attainment measures in the expected direction, although not always so in our full specifications. These findings are testament to the powerful direct effects of demographic factors on school attainment, especially parental education. Findings also reveal that school experiences and behavior, whether attending a particular type of high school or frequent mobility, are more predictive of educational attainment. Indeed, a major strength of our study is that the major predictors exert their influence above and beyond that of sociodemographics.

Limitations

The study has three limitations. First, children in the Chicago Longitudinal Study are almost all African American and grew up in high-poverty neighborhoods in Chicago. Consequently, findings may not generalize to samples more heterogeneous on SES, urbanicity, and race/ethnicity. Replication of the model to other populations and contexts are needed. Second, although the model is comprehensive, some variables that have been identified as predictors of educational attainment, including school climate, peer relations, and adolescent employment (Alspaugh, 1998; Farmer, Estell, Leung, Trott, Bishop, & Cairns, 2003; Rumberger, 1995; Wehlage & Rutter, 1986) were not available in the data set. In addition, parent involvement in school is but one component of family support for children's learning. Finally, explanatory variables were entered hierarchically, and the overall associations with the outcome were examined. Hierarchical regression is not able to show how these variables interact over time across levels of context. Using structural equation modeling might be able to provide better understanding about the process of educational attainment and the indirect effects of predictors. However, the focus in the present study was to identify factors that were associated with educational attainment within a comprehensive set individual, family, and school experiences that have rarely been investigated together in prior studies.

Implications

Despite these limitations, findings suggested several implications for schools, educators, and policymakers. For policymakers, the findings provide information about factors that are associated with educational attainment, which can help design effective programs to promote educational success for at-risk students. Family process factors can promote children's educational attainment as parent involvement in school was positively linked to years of completed education. Comprehensive early childhood intervention (Karoly et al., 2001; Schweinhart et al., 2005) and school reform models such as Comer's School Development Program promote school-family partnerships, strengthen parenting practices, and increase parent involvement in school leading to higher levels of school completion (Patrikakou, Weissberg, Redding, & Walberg, 2005).

Regarding school-related predictors, mobility and high school quality are especially notable predictors of educational attainment to be strengthened. Although it would be hard to develop programs that reduce frequent school mobility due to economic factors, transition programs could be put in place to reduce the potentially negative consequences of mobility such as assigning children that transfer to new schools to classes with fewer children, to afterschool programs, or to more systematic in-school services from school psychologists and social workers. These options plus interventions that begin before the onset of absences or disengagement from school could help protect children against underachievement and dropout. The Seattle Social Development Program, a 6-year intervention beginning in first grade to strengthen school bonds, is an example of an effective preventive intervention (Hawkins, Guo, Hill, Battin-Pearson, & Abbott, 2001).

For educators and other professionals, the findings provide them effective intervention factors to address. The findings provide help to identify students who are at risk of school failure. By providing these students more timely and effective interventions and support services, school dropout can be reduced. The strong contribution of youth expectations to educational attainment is particularly informative in this regard. Attitudes and expectations about schooling are formed early in the educational process by the opportunities children are provided in school and at home, their success experiences that result from these opportunities, and the consequent expectations that substantially determine their future education. Programs and policies that address all these influences together as early as possible have the best chance to enhance children's educational attainment.

Established interventions and strategies that can increase school commitment and raise educational expectations, include mentoring programs such as Big Brothers/Big Sisters (Tierney, Grossman, & Resch, 1995) and Quantum Opportunities (cf., Aos, Lieb, Mayfield, Miller, & Pennucci, 2004), school-based social development (repeat Seattle Social Development Program reference) and community volunteerism (Allen, Philliber, Herring, & Kupermine,

1997), and community-based afterschool programs (Murray & Belenko, 2005).

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(Appendixes follow)

Appendix

Table A1
Correlation Between Outcomes and Independent Variables

	Years of completed education	High school completion	High school graduation
1. Years of completed education	—		
2. High school completion	.879**	—	
3. High school graduation	.832**	.932**	—
4. Preschool participation	.087**	.082**	.073**
5. Follow-on participation	.046	.043	.029
6. Black	−.059*	−.066*	−.059*
7. Girl	.163**	.169**	.168**
8. Free lunch eligibility	−.115**	−.165**	−.169**
9. If mother completed high school at child's birth	.193**	.173**	.177**
10. Single parent status at child's birth	−.086**	−.092**	−.097**
11. If had 4 or more children in household at child's birth	−.024	−.035	−.038
12. Abuse/neglect by age 4	−.030	−.027	−.020
13. Low birth weight	−.024	−.039	−.035
14. Mother less than 18 at child's birth	−.046	−.035	−.030
15. Percent of low-income families in school region	−.001	−.008	−.005
16. ITBS word analysis (age 6)	.211**	.173**	.174**
17. Classroom adjustment (ages 7–9)	.311**	.296**	.291**
18. Perceived competence (ages 9–12)	.216**	.187**	.192**
19. Parent involvement (ages 7–12)	.246**	.228**	.225**
20. Early retention (ages 7–9)	−.170**	−.167**	−.155**
21. Early special education placement (ages 7–9)	−.013	−.030	−.014
22. Parent expectation (ages 10–17)	.207**	.199**	.207**
23. If mother became high school completer (ages 0 to 12)	−.004	.016	.008
24. Ability level of class (ages 10–12)	−.150**	−.152**	−.141**
25. Student expectation (ages 10–16)	.275**	.262**	.248**
26. Teacher expectation (ages 10–12)	.088**	.085**	.076*
27. Days of absence (by age 12)	−.277**	−.252**	−.258**
28. School, percent above grade level in reading (age 11)	.177**	.158**	.171**
29. Moved once (ages 10–14)	−.026	−.017	−.017
30. Moved twice (ages 10–14)	−.097**	−.092**	−.097**
31. Moved three times or more (ages 10–14)	−.150**	−.133**	−.139**
32. Late retention (ages 10–14)	−.182**	−.173**	−.183**
33. Late special education placement (ages 10–14)	−.129**	−.129**	−.110**
34. Magnet element. School (ages 10–14)	.157**	.158**	.160**
35. ITBS reading 8th grade (age 14)	.330**	.327**	.324**
36. Abuse/neglect by age 17	−.144**	−.146**	−.142**
37. Magnet high school	.125**	.098**	.102**
38. Career academy high school	.091**	.080**	.085**
39. Technical high school	.085**	.089**	.087**
40. Chicago non-public high school	.072*	.067*	.069*
41. High school outside of Chicago	.003	−.024	−.008
42. Juvenile arrest by age 18	−.329**	−.321**	−.332**
43. If missing 5 or more variables	−.054	−.046	−.048

* $p < .05$. ** $p < .01$.

Table A2
Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Black	—												
2. Girl	.021	—											
3. Free lunch eligibility	.020	.032	—										
4. Maternal education	.134*	.009	−.137*	—									
5. Single parent status	.164*	−.017	.121*	−.130*	—								
6. Number of children	.006	.016	.016	−.016	−.249*	—							
7. Abuse/neglect by age 4	−.001	.005	−.030	−.030	.025	.049	—						
8. Low birth weight	.083*	.042	.031	−.014	.054	.002	.030	—					
9. Teen parent (< 18)	.036	−.015	.069*	−.262*	.155*	−.114*	−.008	−.004	—				
10. Percent of low-income families in school region	.209*	.027	.041	.003	.102*	.043	.004	.039	.028	—			
11. Preschool participation	.028	.069*	.013	.091*	.024	−.034	.003	−.053	.002	−.017	—		
12. Follow-on participation	.033	.013	.004	.061*	.014	−.032	−.008	−.009	.005	−.076*	.399*	—	
13. ITBS word analysis (K)	.035	.084*	−.087*	.144*	−.023	−.035	−.008	−.086*	−.013	−.067*	.231*	.187*	—
14. Classroom adjustment (1–3)	−.100*	.247*	−.061*	.109*	−.032	−.021	−.009	−.065*	.008	−.043	.146*	.122*	.399*
15. Perceived competence	−.007	.140*	−.083*	.071*	−.015	−.042	−.026	−.017	−.005	−.053	.096*	.082*	.250*
16. Parent involvement	−.075*	.119*	−.007	.127*	−.106*	.004	0	−.064*	.007	−.079*	.146*	.218*	.229*
17. Early retention	−.006	−.120*	.086*	−.101*	.047	.008	.056*	.055	.009	−.004	−.139*	−.147*	−.340*
18. Early special education	.024	−.087*	−.043	−.018	−.009	−.010	.044	−.004	−.045	.027	−.137*	−.051	−.154*
19. Parent expectation	−.021	.116*	−.103*	.098*	−.084*	−.096*	−.046	−.030	−.013	−.013	.061*	.079*	.181*
20. If mother became HS completer by child's age 12	.019	−.013	.072*	−.410*	.076*	−.021	−.027	−.006	.215*	.019	.016	.022	.014
21. Ability level of class	−.042	−.066*	.018	−.067*	−.065*	.079*	.006	.004	.008	.063*	−.098*	−.093*	−.229*
22. Student expectation	.010	.154*	−.010	.104*	−.023	−.002	−.050	−.027	−.016	.028	.081*	.098*	.185*
23. Teacher expectation	−.074*	.037	−.019	.008	−.012	−.028	−.026	−.075*	.011	−.054	.052	0.63*	.106*
24. Days of absence	.028	−.091*	.050	−.113*	.072*	−.005	−.008	.053	−.003	.051	−.062*	−.044	−.082*
25. School, percent above grade level in reading (5th grade)	.045	.061*	−.168*	.180*	−.086*	−.023	−.008	−.068*	−.041	.078*	.152*	.130*	.261*
26. Moved once	.010	0	−.097*	−.004	.014	−.015	−.020	.035	.032	.119*	.023	−.111*	−.003
27. Moved twice	−.005	−.028	.057*	−.065*	.055	−.034	−.005	−.053	.010	−.014	−.038	−.038	−.058*
28. Moved three times or more	.016	−.053	.051	−.072*	.075*	0	.042	.044	.078*	0	−.144*	−.085*	−.134*
29. Late retention	.051	−.136*	.039	−.046	.008	−.018	.041	−.010	.046	.055	−.046	−.055*	−.107*
30. Late special ed. pl	.031	−.166*	.042	−.063*	.020	−.006	−.001	−.005	−.050	.033	−.119*	−.096*	−.257*
31. Magnet element. school	.049	.104*	−.093*	.152*	−.058*	−.030	−.014	−.010	−.061*	.052	.144*	.172*	.194*
32. ITBS reading 8th grade	−.072*	.192*	−.135*	.143*	−.072*	−.067*	−.027	−.075*	−.021	−.054	.147*	.122*	.423*
33. Abuse/neglect by age 17	.034	.030	.050	−.090*	.110*	−.094*	.002	.071*	.032	−.021	−.099*	−.043	−.069*
34. Magnet HS	.018	.114*	−.014	−.003	−.060*	.019	−.021	.052	.003	−.066*	.080*	.060*	.058*
35. Career academy HS	.110*	.073*	−.025	.093*	.017	.009	−.019	−.033	−.060*	−.039	.032	.068*	.045
36. Technical HS	−.009	.037	.002	−.009	.010	−.047	.037	−.050	.017	−.019	.020	.020	.075*
37. Chicago nonpublic HS	−.090*	−.032	−.065*	.066*	−.030	−.012	−.018	.044	−.052	−.059*	−.025	−.023	.031
38. HS outside of Chicago	.049	.002	−.045	.026	−.003	−.058*	.017	.018	−.019	.021	−.024	−.002	−.030
39. Juvenile arrest	.037	−.321*	.070*	−.064*	.072*	.013	0	−.012	.033	.016	−.105*	−.006	−.109*
40. If missing 5 or more variables	−.027	−.051	−.191*	−.071*	−.011	−.080*	.011	−.005	−.012	−.012	−.047	−.060*	.007

(*table continues*)

Table A2 (*continued*)

	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Black													
2. Girl													
3. Free lunch eligibility													
4. Maternal education													
5. Single parent status													
6. Number of children													
7. Abuse/neglect by age 4													
8. Low birth weight													
9. Teen parent (< 18).036													
10. Percent of low-income families in school region													
11. Preschool participation													
12. Follow-on participation													
13. ITBS word analysis (K)													
14. Classroom adjustment (1–3)	—												
15. Perceived competence	.442*	—											
16. Parent involvement	.432*	.287*	—										
17. Early retention	−.378*	−.150*	−.229*	—									
18. Early special education	−.184*	−.110*	−.102*	.120*	—								
19. Parent expectation	.251*	.198*	.180*	−.196*	−.061*	—							
20. If mother became HS completer by child's age 12	.054	.056*	.081*	−.043	−.050	.082*	—						
21. Ability level of class	−.228*	−.198*	−.146*	.141*	.086*	.029	−.130*	—					
22. Student expectation	.265*	.220*	.250*	−.112*	−.093*	.151*	.069*	−.145*	—				
23. Teacher expectation	.177*	.178*	.352*	−.093*	−.039	.053	.073*	.026	.249*	—			
24. Days of absence	−.187	−.096	−.232*	.051	.047	−.071*	−.014	.086*	−.131*	−.072*	—		
25. School, percent above grade level in reading (5th grade)	.128*	.105*	.158*	−.115*	−.008	.151*	−.026	−.162*	−.131*	.100*	−.113*	—	
26. Moved once	−.025	−.044	−.124*	.002	−.008	.002	.011	.064*	−.102*	−.080*	.035	−.084*	—
27. Moved twice	−.079*	−.068*	−.125*	.061*	.049	−.018	−.010	.037	−.035	−.074*	.050	−.070*	−.312*
28. Moved three times or more	−.116*	−.096*	−.110*	.106*	−.009	−.107*	−.069*	.062*	−.107*	−.082*	.118*	−.088*	−.233*
29. Late retention	−.202*	−.169*	−.153*	−.014	.046	−.129*	−.042	.080*	−.124*	−.076*	.062*	−.040	.006
30. Late special ed. pl	−.332*	−.233*	−.149*	.237*	.554*	−.163*	.001	.158*	−.155*	−.077*	.055*	−.038	−.017
31. Magnet element. school	.094*	.101*	.072*	−.125*	−.011	.127*	−.039	−.107*	.094*	−.036	−.048	.642*	−.092*
32. ITBS reading 8th grade	.571*	.390*	.370*	−.423*	−.196*	.290*	.057*	−.278*	.278*	.167*	−.200*	.285*	−.036
33. Abuse/neglect by age 17	−.096*	−.126*	−.162*	.046	.024	−.102*	−.032	.047	−.049	−.016	.106*	−.097*	.038
34. Magnet HS	.067*	.066*	.108*	−.053	−.005	.058*	−.005	−.007	.059	.030	−.069*	.023	−.048
35. Career academy HS	.111*	.135*	.112*	−.046	−.039	.017	−.020	−.092*	.119*	.040	−.046	−.006	−.030
36. Technical HS	.163*	.115*	.108*	−.041	−.003	.059*	.047	−.066*	.096*	.026	−.088*	.143*	−.022
37. Chicago nonpublic HS	.043	.046	.056*	−.036	−.019	.084*	−.035	−.066*	.025	−.006	−.014	.070*	−.028
38. HS outside of Chicago	−.019	−.005	−.049	−.017	−.009	.027	−.084*	−.075*	−.055	−.056*	.021	.004	.080*
39. Juvenile arrest	−.195*	−.165*	−.148*	.115*	.067*	−.124*	.022	.079*	−.166*	−.036	.102*	−.105*	.034
40. If missing 5 or more variables	−.085*	.013	−.233*	−.030	.043	.039	−.104*	.069*	−.283*	−.195*	.144*	−.048	.217*

Table A2 (*continued*)

	27	28	29	30	31	32	33	34	35	36	37	38	39
1. Black													
2. Girl													
3. Free lunch eligibility													
4. Maternal education													
5. Single parent status													
6. Number of children													
7. Abuse/neglect by age 4													
8. Low birth weight													
9. Teen parent (< 18).036													
10. Percent of low-income families in school region													
11. Preschool participation													
12. Follow-on participation													
13. ITBS word analysis (K)													
14. Classroom adjustment (1–3)													
15. Perceived competence													
16. Parent involvement													
17. Early retention													
18. Early special education													
19. Parent expectation													
20. If mother became HS completer by child's age 12													
21. Ability level of class													
22. Student expectation													
23. Teacher expectation													
24. Days of absence													
25. School, percent above grade level in reading (5th grade)													
26. Moved once													
27. Moved twice	—												
28. Moved three times or more	−.132*	—											
29. Late retention	.055*	.118*	—										
30. Late special ed. pl	.092*	.066*	.156*	—									
31. Magnet element. school	−.052	−.063*	−.074*	−.041	—								
32. ITBS reading 8th grade	−.113*	−.120*	−.227*	−.366*	.216*	—							
33. Abuse/neglect by age 17	.003	.166*	.121*	.078*	−.094*	−.114*	—						
34. Magnet HS	.017	.023	−.060*	−.048	.046	.103*	−.031	—					
35. Career academy HS	−.030	−.071*	−.068*	−.056*	.051	.114*	.014	−.123*	—				
36. Technical HS	−.028	−.044	−.025	−.007	.135*	.180*	−.037	−.055*	−.071*	—			
37. Chicago nonpublic HS	.061*	−.053	−.005	−.026	.049	.059*	−.022	−.066*	−.051	−.024	—		
38. HS outside of Chicago	.036	.007	.014	−.022	−.010	−.013	.003	−.065*	−.071*	−.024	.112*	—	
39. Juvenile arrest	.034	.115*	.103*	.145*	−.109*	−.201*	.158*	−.074*	−.037	−.071*	−.038	−.035	—
40. If missing 5 or more variables	.017	.003	−.018	−.037	−.032	−.073*	.018	−.085*	−.126*	−.010	.052	.174*	.043

Note. Variance inflation factor (VIF) was used to examine the degree of multicollinearity. A rule of thumb is that any VIF of 10 or more provides evidence of serious multicollinearity involving the corresponding independent variables (Cohen, Cohen, West & Aiken, 2003). The VIFs of the explanatory variables range from 1.029 (report any child abuse/neglect by age 4) to 2.052 (ITBS reading scores at age 14). Some coefficients from the analyses without replacing the missing values are provided here. First is the result on years of completed education. Mother completed high school at child's birth ($b = .521$, $p < .01$) was significantly associated with more years of completed education. Among school commitment variables, days of absence ($b = -.064$, $p < .01$) was associated with fewer years of completed education. Among high school experiences, attendance of magnet high school ($b = .356$, $p < .05$) was significantly associated with more years of completed education, and juvenile arrest by age 18 ($b = -1.065$, $p < .01$) was associated with fewer years of completed education. Second is the result on high school completion. Mother completed high school at child's birth (odds ratio [OR] = 2.34; 95% confidence interval [CI] = 1.55, 3.52) were significantly associated with a lower rate of high school completion. Among school commitment variables, days of absence (OR = .92; 95% CI = .89, .96) was significantly associated with a lower rate of high school completion. Juvenile arrest by age 18 (OR = .21; 95% CI = .12, .38) were associated with a lower rate of high school completion. The pattern of the results for high school graduation is similar to that of high school completion.

* $p < .05$.