California Dropout Research Project
An Affiliated Project of the University of California Linguistic Minority Research Institute
UC Santa Barbara | Gevirtz Graduate School of Education

Why Students Drop Out of School: A Review of 25 Years of Research

California Dropout Research Project Report #15
October 2008
Revised August 2009

By

Russell W. Rumberger and Sun Ah Lim
University of California, Santa Barbara

This report was prepared for the California Dropout Research Project. The authors would like to thank Jeremy Finn and Stephen Lamb for their helpful comments on an earlier draft of this report, and Beverly Bavaro and Susan Rotermund for their editorial assistance.

Abstract

To address the dropout crisis requires a better understanding of why students drop out. Although dropouts themselves report a variety of reasons for leaving school, these reasons do not reveal the underlying causes, especially multiple factors in elementary or middle school that may influence students' attitudes, behaviors, and performance in high school prior to dropping out. To better understand the underlying causes behind students' decisions for dropping out, this study reviewed the past 25 years of research on dropouts. The review is based on 203 published studies that analyzed a variety of national, state, and local data to identify statistically significant predictors of high school dropout and graduation. Although in any particular study it is difficult to demonstrate a causal relationship between any single factor and the decision to quit school, a large number of studies with similar findings does suggest a strong connection. The research review identified two types of factors that predict whether students drop out or graduate from high school: factors associated with *individual characteristics* of students, and factors associated with the *institutional characteristics* of their families, schools, and communities.

The United States is facing a dropout crisis. An estimated 25 percent of public school students who entered the high school in the fall of 2000 failed to earn a diploma four years later in 2003-04 (Laird, Kienzi, DeBell, & Chapman, 2007, Table 12). In California, more than 26 percent of ninth graders failed to graduate over the same period. Dropout rates are even higher for some student populations, including African American students, Hispanic students, English learners, and students with disabilities. In some schools and communities up to 50 percent of all entering ninth grade students fail to graduate..

Because of their failure to complete high school, dropouts experience a host of negative outcomes (Belfield & Levin, 2007). Compared to high school graduates, dropouts have: higher rates of unemployment; lower earnings; poorer health and higher rates of mortality; higher rates of criminal behavior and incarceration; increased dependence on public assistance; and are less likely to vote. The negative outcomes from dropouts generate huge social costs. Federal, state, and local governments collect fewer taxes from dropouts. The government also subsidizes the poorer health, higher criminal activity, and increased public assistance of dropouts. One recent study estimated that each new high school graduate would generate more than $200,000 in government savings, and that cutting the dropout rate in half from a single cohort of dropouts would generate more than $45 billion in savings to society at large (Belfield & Levin, 2007).

To address the dropout crisis requires a better understanding of why students drop out. Yet identifying the causes of dropping out is extremely difficult. Like other forms of educational achievement (e.g., test scores), the act of dropping out is influenced by an array of factors related to both the individual student and to the family, school, and community settings in which the

student lives (National Research Council, Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004).

Dropouts themselves report a variety of reasons for leaving school, including school-related reasons, family-related reasons, and work-related reasons (Bridgeland, DiIulio Jr., & Morison, 2006; Rotermund, 2007). The most cited reasons reported by 2002 tenth-graders who dropped out were "missed too many school days" (44 percent); "thought it would be easier to get a GED" (41 percent); "getting poor grades/failing school" (38 percent); "did not like school" (37 percent); and "could not keep up with schoolwork" (32 percent) (Rotermund, 2007). But these reasons do not reveal the underlying causes of why students quit school, particularly those factors in elementary or middle school that may have contributed to students' attitudes, behaviors, and performance immediately preceding their decision to leave school. Moreover, if many factors contribute to this phenomenon over a long period of time, it is virtually impossible to demonstrate a causal connection between any single factor and the decision to quit school.

A number of theoretical models that have attempted to explain this phenomenon and its relationship to other indicators of school performance further illustrate this complexity. For example, some scholars have viewed dropping out of school as the final stage in a dynamic and cumulative process of disengagement (Newmann, 1992; Rumberger, 1987; Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989) or withdrawal (Finn, 1989) from school that is influenced by a variety of proximal and distal factors. Other scholars have characterized student mobility—the act of students making non-promotional school changes—as a less severe form of student disengagement or withdrawal from school (Lee & Burkam, 1992; Rumberger & Larson, 1998; Rumberger, 2003). In the latter case, students are withdrawing from a particular school, while in the former case students are withdrawing from school altogether. Together, both activities can

be characterized as aspects of persistence. Persistence, in turn, influences educational attainment, such as whether students earn credits or are promoted to the next grade level, and eventually graduate with a diploma.

Although existing research is unable, for the most part, to identify unique causes of dropping out, a vast empirical research literature has examined numerous predictors of high school dropout and graduation. The empirical research comes from a number of social science disciplines and is generally based on two different perspectives: (1) an *individual perspective* that focuses on individual factors such as students' attitudes, behaviors, school performance, and prior experiences; and (2) an *institutional perspective* that focuses on the contextual factors found in students' families, schools, communities, and peers.

A number of studies have reviewed this literature (Finn, 1989; Hammond, Linton, Smink, & Dew, 2007; Rumberger, 1987; Rumberger, 2004) and the literature on the related phenomenon of student engagement (Fredricks, Blumenfeld, & Paris, 2004; National Research Council, Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004) and student mobility (Rumberger, 2003). The last comprehensive reviews of the dropout literature were done in the 1980s (Finn, 1989; Rumberger, 1987). Since that time, a large number of empirical studies have been published.

This paper provides a contemporary review of the vast research literature on predictors of high school dropout and graduation. The paper first reviews the theoretical literature on student dropout and graduation, and uses it to develop a conceptual framework for reviewing the research literature. It then describes the procedures for identifying the research literature published over the last 25 years, and some of the features of that literature. Finally, it reviews the empirical literature by providing a capsule summary of all the major predictors of high

school dropout and graduation. Where available, the discussion also draws on existing reviews of the literature that examine the relationship between specific predictors and dropping out.

Theoretical and Conceptual Models

Several theoretical and conceptual models have been advanced to explain student persistence.[1] Most models have attempted to explain why students drop out of high school. Some have attempted to explain engagement, an important precursor to dropping out. Another model has been used to explain institutional departure from higher education. These models have focused largely on the individual antecedents of persistence and less on the institutional characteristics that affect them. Other models have been developed to explain the contribution of families, schools, and communities to student educational performance more generally. Together these models have identified a number of key concepts or factors (italicized in the discussion below) that explain persistence and can be used to construct a conceptual framework of high school dropout and graduation.

Models of School Dropout

One group of models addresses the issue of why students drop out of secondary school. Existing dropout models all suggest that the process is influenced by several types of factors: early and recent school performance, academic and social behaviors, and educational as well as general attitudes. What differentiates these models is how these various factors interact to foster the process of gradual withdrawal and ultimately dropping out, as well as the relative focus on individual versus institutional factors.

[1] Some of the models are derived by specific theories of the dropout process, while others are derived post-hoc from empirical investigations. We do not distinguish between these two types of models in our discussion.

Wehlage and his colleagues developed a model in which dropping out, as well as other school outcomes, is jointly influenced by two broad factors: *school membership* (or social bonding) and *educational engagement* (Wehlage et al., 1989). School membership concerns the social dimension of schooling and is influenced by such things as social ties to others, commitment to the institution, involvement in school activities, and beliefs in the value and legitimacy of school. Educational engagement concerns the academic dimension of schooling and is influenced by the extrinsic rewards associated with school work and the intrinsic rewards associated with the curriculum and the way educational activities are constructed.

Finn (1989) reviews two alternative models. The first, which he labels the "frustration-self-esteem" model, argues that the initial antecedent to school withdrawal is early *school failure,* which, in turn, leads to low *self-esteem* and then *problem behaviors*. Problem behaviors further erode school performance and, subsequently, self-esteem and behavior. Eventually, students either voluntarily quit school or are removed from school because of their problematic behavior.

The second model Finn labels the "participation-identification" model. In this model, the initial antecedent to withdrawal is the lack of *participation* in school activities, which, in turn, leads to poor school performance and then to less *identification* with school. Participation in school activities includes responding to teacher directions and class requirements, participation in homework and other learning activities, participation in non-academic school activities, and participation in the governance of the school. This model argues there is both a *behavioral* and *emotional* component to the withdrawal process.

Both of Finn's models involve long-term processes that begin in early elementary school. A number of other models of the dropout process have been developed in recent years based on long-term empirical studies of small cohorts of students in particular communities (Alexander,

Entwisle, & Kabbini, 2001; Ensminger & Slusacick, 1992; Garnier, Stein, & Jacobs, 1997; Ou, 2005; Reynolds, On, & Topitzes, 2004). For example, Alexander and colleagues (2001) developed a "life course perspective" model of high school graduation based on a cohort study of first grade students in the Baltimore city schools that started in 1982. The model examines the effects of school experiences, parental resources, and personal resources in first grade, later elementary school, middle school, and high school on whether students dropped out or graduated.

These models identify some important factors that influence student withdrawal from school, including attitudinal and behavioral factors. But the models do not differentiate between factors that might affect student withdrawal from a particular institution (mobility) and those that might affect student withdrawal from schooling altogether (dropping out). Moreover, the models do not specifically address features of schools that may directly influence students' participation and identification with school. Yet several studies have shown that schools consciously and directly contribute to student withdrawal by the kinds of policies and practices they engage in, especially with respect to certain kinds of students (Bowditch, 1993; Fine, 1991; Wehlage & Rutter, 1986).

Models of Student Engagement

One of the most important and immediate factors associated with dropping out in the preceding models is student engagement. Because student engagement has been identified as an important precursor to both dropping out and student academic achievement, there is a growing theoretical and empirical literature on the subject.

Newman, Wehlage, and Lamborn (1992) developed a model of engagement in academic work, which they define as "the student's *psychological investment* in and *effort* directed toward

learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote" (p. 12). As they point out, because engagement is an inner quality of concentration and effort, it is not readily observed, so it must be inferred from indirect indicators such as the amount of participation in academic work (attendance, amount of time spent on academic work), *interest* and *enthusiasm*. They posit that engagement in academic work is largely influenced by three major factors: "students' underlying *need for competence*, the extent to which students experience membership in the school, and the *authenticity* of the work they are asked to complete" (p. 17). They identify a number of factors that influence school membership and authentic work similar to those identified by Wehlage, et al. (1989) in their model of student dropout.

In their extensive review of research literature, Fredericks, Blumenfeld, and Paris (2004) identify three dimensions of engagement. *Behavioral engagement* represents behaviors that demonstrate students' attachment and involvement in both the academic and social aspects of school, such as doing homework and participating in extracurricular activities like athletics or student government. *Emotional engagement* refers to students' affective reactions to their experiences in school and in their classes, such as whether they are happy or bored. *Cognitive engagement* represents mental behaviors that contribute to learning, such as trying hard and expending effort on academic tasks. Their review goes on to examine both the outcomes and the antecedents to engagement. The antecedents include school-level factors, such as school size, communal structures, and disciplinary practices; and classroom-level factors, such as teacher support, peers, classroom structure, and task characteristics.

Some conceptions of engagement include student attitudes, while other conceptions view student attitudes as precursors to engagement. This distinction reflects the fact that students may

arrive at school with a set of attitudes, while engagement only occurs as a result of students' experiences after they arrive. For example, the 2004 National Research Council report, *Engaging Schools: Fostering High School Students' Motivation to Learn*, developed a model of academic engagement which is manifested in behaviors and emotions toward academic work which, in turn, are influenced by three psychological variables: students' beliefs about their *competence* and control (*I can*), their *values* and *goals* (*I want to*), and their sense of *social connectiveness* or *belonging* (*I belong*) (National Research Council, Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004).

Models of student engagement are related to and often incorporate concepts from models of student motivation. Connell (1990), for example, developed a model of student motivation that postulates individuals are motivated to engage in activities that meet three psychological needs for *autonomy*, *competence*, and *relatedness*. The degree to which students perceive the school setting as meeting those needs determines how engaged or disaffected they will be in school. Osterman (2000) reviews the literature on *belonging* and finds that it is related to both engagement and dropping out. Eccles and Wigfield (2002) review a number of different theories on *motivation*, *beliefs*, *values*, and *goals* and how they relate to *achievement behaviors*, concluding that there needs to be more integration of these theories.

Models of Deviance

Although much of the theoretical and empirical literature on school dropout has focused on within-school factors, there is a substantial body of research that has focused on out-of-school factors. In particular, social scientists in such fields as psychology, sociology, economics, and criminology have focused on a range of deviant behaviors—including juvenile delinquency, drug and alcohol abuse, teenage parenting and childbearing—and their relationship to school dropout.

Battin-Pearson, et al. (2000) identified five alternative theories of dropout that focused on different sets of predictors: (1) academic mediation theory that focuses on academic achievement, (2) general deviance theory that focuses on deviant behaviors, (3) deviant affiliation theory that focuses on peer relationships, (4) family socialization theory that focuses on family practices and expectations, and (5) structural strains theory that focuses on demographic factors such as gender, race and ethnicity, and family socioeconomic status. The models not only differ with respect to the salient predictive factors, they differ in whether the factors influence dropout behavior directly, or whether the effects are mediated by other factors, such as academic achievement. In addition to general models of deviance, criminologists have developed a number of alternative theories to explain why involvement with the juvenile justice system may be detrimental or beneficial to subsequent delinquent behavior and school dropout (Sweeten, 2006).

A Model of Institutional Departure from Higher Education

Another theoretical perspective that is useful in explaining dropout behavior is a widely acknowledged theory of institutional departure at the postsecondary level developed by Tinto (1987). In Tinto's model, the process of departure is first influenced by a series of personal attributes, which predispose students to respond to different situations or conditions in particular ways. These personal attributes include *family background*, *skills and abilities*, and *prior school experiences*, including *goals* (intentions) and *motivation* (commitments) to continue their schooling. Once students enroll in a particular school, two separate dimensions of that institution influence whether a student remains there: a social dimension that deals with the *social integration* of students with the institution and to the value of schooling; and an academic dimension that deals with the *academic integration* or engagement of students in meaningful

learning. Both dimensions are influenced by the informal as well as the formal structure of the institution. For example, academic integration may occur in the formal system of classes and in the informal system of interactions with faculty in other settings.

These two dimensions can have separate and independent influences on whether students leave an institution, depending on the needs and attributes of the student, as well as external factors. To remain in an institution, students must become integrated to some degree in either the social system or the academic system. For example, some students may be highly integrated into the academic system of the institution, but not the social system. Yet as long as their social needs are met elsewhere and their goals and commitment remain the same, such students will remain in the same institution. Likewise, some students may be highly integrated into the social system of the institution, but not the academic system. But again, as long as they maintain minimum academic performance and their goals and commitment remain the same, such students will remain in the same institution.

Tinto's theory offers several insights to explain another aspect of persistence—student mobility. First, it distinguishes between the commitment to the goal of finishing college and the commitment to the institution, and how these commitments can be influenced by students' experiences in school over time (p. 115). Some students who are not sufficiently integrated into their current college may simply transfer to another educational setting rather than drop out, if they can maintain their goals and commitment to schooling more generally. Other students, however, may simply drop out rather than transfer to another school if their current school experiences severely diminish their goals and commitment to schooling. Second, the theory suggests that schools can have multiple communities or subcultures (p. 119) to accommodate and support the different needs of students. Third, the theory acknowledges the importance of

external factors that can influence student departure. For example, external communities, including families and friends, can help students better meet the academic and social demands of school by providing necessary support. External events can also change a student's evaluation of the relative costs and benefits of staying in a particular school if other alternatives change (e.g., job prospects). With respect to secondary school departure, a change in family circumstances, such as family relocation or family structure (e.g., divorce) could force students to change schools.

Models of Institutions

While most models of high school dropout focus on individual factors, scholars generally acknowledge that the various settings or contexts in which students live—families, schools, and communities—all shape their attitudes, behaviors, and educational performance (Jessor, 1993; National Research Council, Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004). There is a substantial body of research that has identified the salient features of families, schools, and communities that contribute to students' educational performance (Hoover-Dempsey & Sandler, 1997; Leventhal & Brooks-Gunn, 2000; Pomerantz, Moorman, & Litwack, 2007; Rumberger & Palardy, 2004). The features include: *composition*, such as the characteristics of the persons within the setting or context; *structure*, such as size and location; *resources*, such as physical, fiscal and human resources; and *practices*, such as parenting practices within families and instructional practices within schools.

A Conceptual Model of Student Performance

These models can be used to construct a conceptual framework for understanding the process of dropping out and graduation, as well as the salient factors underlying that process. The framework, illustrated in Figure 1, considers dropping out and graduation as specific aspects

of student performance in high school and identifies two types of factors that influence that performance: individual factors associated with students, and institutional factors associated with the three major contexts that influence students—families, schools, and communities.

Individual factors can be grouped into four areas or domains: educational performance, behaviors, attitudes, and background. Although the framework suggests a causal ordering of these factors, from background to attitudes to behaviors to performance, the various models of dropout and engagement discussed earlier indicate a less linear relationship. In particular, the relationship between attitudes and behaviors is generally considered to be more reciprocal; for example, initial attitudes may influence behaviors, which, in turn, may influence subsequent attitudes (as suggested by Tinto's model). But the purpose of this framework is not to suggest a particular model of the dropout process, but simply a framework for organizing a review of the literature. The factors listed within each group represent conceptual categories that may be measured by one or more specific indicators or variables

The first domain is educational performance. The framework posits three inter-related dimensions of educational performance: (1) academic achievement, as reflected in grades and test scores, (2) educational persistence, which reflects whether students remain in the same school or transfer (school mobility) or remain enrolled in school at all (dropout), and (3) educational attainment, which is reflected by progressing in school (e.g., earning credits and being promoted from one grade to another) and completing school by earning of degrees or diplomas. The framework suggests that high school graduation is dependent on both persistence and achievement. That is, students who either interrupt their schooling by dropping out or changing schools, or who have poor academic achievement in school, are less likely to progress in school and to graduate.

The second domain consists of a range of behaviors that are associated with educational performance. The first factor is student engagement, which we list in the behavioral group even though some conceptions of engagement, as discussed earlier, can have attitudinal (emotional) as well as behavioral components. Other behaviors that have been identified in the research literature include coursetaking, deviance (misbehavior, drug and alcohol use, and childbearing), peer associations, and employment.

The third domain consists of attitudes, which we use as a general label to represent a wide range of psychological factors including expectations, goals, values, and self-perceptions (e.g., perceived competence, perceived autonomy, and perceived sense of belonging).

The last domain consists of student background characteristics, which include demographic characteristics, health, prior performance in school, and past experiences, such as participation in preschool, after-school activities, and summer school.

The framework further posits that these individual-level characteristics are influenced by three institutional contexts—families, schools, and communities—and several key features within them: composition, structure, resources, and practices.

The Research Literature on High School Dropout and Graduation

To undertake this review, we first had to identify the relevant research literature, which is sizeable and has grown substantially, especially over the last decade. To keep this review manageable, we focused on multivariate, statistical studies that sought to identify predictors of high school dropout and graduation. Thus, we excluded from our review descriptive statistical studies and qualitative studies, although such studies provide rich descriptions of the dropout

process in ways that statistical studies cannot.[2] We further restricted our search to articles published in refereed journals found in the *Social Sciences Citation Index*, an index of over 1,950 journals that covers 50 social science disciplines. Thus, we also excluded empirical studies published in other venues, such as online journals, book chapters, and research reports published by government agencies and independent organizations (e.g., "think tanks"), because it is difficult to conduct a systematic review of such sources and to judge the quality of the publication. Using peer-reviewed journals provides a useful filter of academic quality.

We searched the database for empirical studies published in the U.S. from 1983 through 2007, using a number of search terms that included various combinations of the words "high school, dropout, dropping out, graduation, and completion." The search yielded an initial sample of more than 1,000 studies. We then reviewed the studies to identify those involving multivariate statistical analyses in which the dependent variable was dropout, graduate, or completer. "Graduate" generally refers to someone who earned a high school diploma, while "completer" includes someone who earned either a high school diploma or a high school equivalency certificate, such as a General Educational Development (GED) certificate. The final sample included 203 studies.

Next, we analyzed the studies and generated descriptive information on several key features:

1. the source of data and characteristics of the sample(s), including the age and grades of the students and the sample size(s);
2. the method(s) of analysis;
3. the dependent variable(s); and,

[2] There are many excellent qualitative studies of high school dropouts; however, many of them appear in books (Flores-Gonzalez, 2002; Romo and Falbo, 1996; Valenzuela, 1999), while relatively few appear in academic journals (Delgado-Gaitan, 1988; Tidwell, 1988).

4. the types of predictor (independent) variables.

A complete alphabetical list of the studies, along with the basic descriptive information, is provided in Appendix Table A1.

To conduct this review, we further identified studies that involved analyses of multiple samples of data, either subsamples of data from a single data source (e.g., men and women) or multiple samples from different data sources. There were 389 analyses of separate samples within these 203 studies. These 389 analyses are the primary focus of this review.

Table 1 provides a summary of some of the key features of these analyses. One feature concerns geography and data sources. The vast majority of the analyses (306) focused on the national level, utilizing a number of national, government-sponsored datasets. The most common datasets were: (1) the National Education Longitudinal Study of 1988 (NELS:88) dataset (used in 74 analyses), a longitudinal study of 24,599 eighth grade students who were first surveyed in the spring of 1988 [3]; (2) the High School Beyond (HSB) dataset (used in 60 analyses), a longitudinal study of 35,723 sophomores and 34,981 seniors who were first surveyed in the spring of 1979[4]; (3) the Panel Study in Income Dynamics (PSID) dataset (used in 33 analyses), a longitudinal study of nearly 8,000 U.S. families and individuals who were first surveyed in 1968[5]; (4) and the National Longitudinal Surveys (NLS) datasets (used in 75 analyses), a set of longitudinal surveys of men and women of various age cohorts.[6] Twelve of the analyses focused on particular states, and 92 analyses focused on the local level, such as particular school districts or schools. Some local datasets have been the subject of considerable research on dropouts and other topics. For example, the Beginning School Study (BSS), a

[3] For more information, see: http://nces.ed.gov/surveys/nels88/
[4] For more information, see: http://nces.ed.gov/surveys/hsb/
[5] For more information, see: http://psidonline.isr.umich.edu/
[6] For more information, see: http://www.bls.gov/nls/

longitudinal study of 661 first-grade students who were enrolled in 20 Baltimore (Maryland) city schools in the fall of 1982, was used in six of the studies and 10 of the analyses. The Chicago Longitudinal Study (CLS), an ongoing study of 1,539 children who participated in preschool and early childhood services from ages 3-9 beginning in 1986, was used in eight of the studies and 10 of the analyses.

A second feature concerns the sampled populations. The vast majority of the analyses were based on samples of the entire U.S. school-age population, but a number of analyses were based on specific subpopulations. For example, 28 analyses were based on samples of males, 25 analyses were based on samples of females, 16 analyses were based on samples of Whites, 32 analyses were based on samples of Blacks, and 14 analyses were based on samples of Hispanics. Other analyses were conducted on samples representing family socioeconomic status (SES), family structure, and disabilities. Additional analyses were based on school populations, such as public schools, Catholic schools, and schools with particular student populations. Finally, some analyses were done on geographic characteristics, such as urban, rural or communities with particular population characteristics.

A third feature concerns the dependent variable. The dependent variable in 257 of the analyses was dropout: 13 analyses were on early dropout (grades 8-10), 89 were on later dropout (grades 10-12), and 155 were on dropout from grades 8-12 or dropout generally (where the grade level was not specified). Another 84 analyses focused on high school graduation, and 48 analyses focused on high school completion.

A fourth feature concerns the time horizon of the predictors used in the analyses. Most of the analyses only used predictors associated with high schools, such as the characteristics of students in high school; but some studies looked at earlier predictors: 113 of the analyses

included middle school predictors, and 43 of the analyses included preschool and elementary school predictors.

The last feature concerns the methods of analysis. A variety of statistical techniques were used to conduct these analyses (see Appendix Table A1). The vast majority of the analyses were conducted with multivariate statistics techniques, such as logistic regression and probit, which are particularly suited to studying dichotomous outcomes such as dropout or graduation. These techniques are used in linear models to estimate the direct effects of a set of predictor variables on the outcome variable at a single point in time. Often these are estimated in a series of steps, with each step adding additional predictors, which provides a way to determine whether the effects of initial (distal) predictors (e.g. student background characteristics) are mediated by other, more recent (proximal) predictors (e.g., achievement). In those cases, we examined whether the predictor of interest had either a direct or indirect effect on dropping out or graduation. Some analyses were conducted using path analysis and structural equation models to estimate the direct and indirect effects of the complete set of predictors in a single model. Other analyses used techniques (even history) for estimating the effects of both fixed and time-varying predictor variables on the outcome over multiple periods of time. Some analyses used techniques for analyzing multi-level data to estimate the simultaneous effects of both individual-level and institutional-level predictors.

All of these techniques can be used to estimate the magnitude and the significance of the relationship between each predictor variable and the outcome variable, controlling for the effects of the other predictors in the model. Of course, the magnitude and significance of the relationship depends, in part, on what other predictors are included in the model. Controlling for more related variables would likely have a greater impact than controlling for fewer related

variables. For example, including two measures of academic achievement, such as grades and test scores, could render one of the two measures insignificant.

Finally, it should be noted that a statistically significant relationship does not imply causality, because in most cases the models are unable to control for other, unobserved variables that may be related to the outcome variable and, as a result, bias the estimated relationship between the predictor variable of interest and the outcome variable. Some research designs and statistical models do allow one to make causal inferences (Schneider et al., 2007). We note such models in our review.

To conduct this review, we identified all of the predictor variables in each analysis and determined whether the variable had a statistically positive, statistically negative, or insignificant direct or indirect effect on the outcome variable.[7] We used the threshold level of .05 to determine statistical significance. We then tabulated the results for each major predictor at the elementary/preschool, middle, and high school levels. The individual predictors are shown in Table 2 and the institutional predictors are shown in Table 3.

Individual Predictors

A variety of individual factors predict whether students drop out or graduate from high school. Following our conceptual framework, we discuss four types of factors: (1) educational performance, (2) behaviors, (3) attitudes, and (4) background. Within each of these four clusters, we identify the major factors that have been identified in the literature, and then the most common specific predictors or indicators that have been examined in the empirical studies.

[7] We reverse-coded predictors of graduation and completion to be consistent with predictors of dropout. We did not code predictors in studies where the predictors served as control variables and their estimated effects were not reported.

Educational Performance

Both dropping out and graduating from high school represent two aspects of educational performance that are related to other aspects of educational performance.

Academic achievement. One of the most widely studied predictors of high school dropout and graduation is academic achievement. Two indicators of academic achievement—*test scores* and *grades*—have been shown to predict whether students drop out or graduate from high school. Of the 389 analyses in our review, more than 200 of them included at least one measure of academic achievement. A majority of the studies found that academic achievement had a statistically significant effect on the likelihood of dropping out or graduating from high school. At the high school level, 30 of the 51 analyses found that higher test scores lowered the risk of dropping out or, conversely, lower test scores increased the risk of dropping out. Of the 45 analyses that examined grades, 30 found that high grades reduced the risk of dropping out. In general, the results are more consistent (e.g., a higher proportion of statistically significant effects) for grades than for test scores, which reflects the fact that test scores represent students' ability usually measured on one or two days; whereas grades reflect students' effort as well as their ability throughout the school year. In that sense, grades are a more "robust" measure of academic achievement than test scores. The results also show that academic performance in both middle and elementary school can often predict whether students will drop out or graduate in high school. Again, grades appear to be a more consistent predictor than test scores. Finally, two analyses found that failing courses in middle and high school increased the odds of dropping out (Balfanz, Herzog, & Mac Iver, 2007; Reyes, 1993).[8]

[8] Several reports based on analyses of school district databases have found that course failures in middle and high school are highly predictive of whether students dropout or graduate (Allensworth & Easton, 2005; Kurlaender, Reardon, & Jackson, 2008; Silver, Saunders, & Zarate, 2008)

Persistence. Both dropping out and transferring schools—often referred to as *student mobility*—can be considered forms of persistence, with student mobility the less severe form of non-persistence. In fact, persistence can be considered along a continuum: students may quit school permanently or temporarily—in the latter case, they simply re-enroll, often at another school, and the period they are out of school may vary from a short amount of time to a long amount of time. Students who transfer simply quit one school and enroll in another, often for a variety of reasons, both voluntary (e.g., they find a more suitable program or school environment) and involuntary (e.g., they get transferred because of poor grades or behavior problems) (Ream, 2005; Rumberger, 2003). But there can also be a period of time between when students leave one school and enroll in another, particularly if the transfer occurs in the middle of an academic year. Often student mobility is associated with residential mobility, as we illustrate in our discussion of family factors, below.

The research literature shows that student mobility, at least during middle and high school, is positively related to school dropout and graduation. At the high school level, 10 of 14 analyses found that student mobility increased the odds of dropping out or decreased the odds of graduating. At the middle school level, nine of 13 analyses found a positive impact of student mobility.[9] At the elementary level, eight of 14 analyses found a significant relationship. One possible reason for the stronger impact at the secondary level is that the secondary students are more sensitive to the disruptions to their friendship networks (Ream, 2005; Ream & Rumberger, 2008). It should be noted that the significant association between mobility and dropout could be due to preexisting factors that influence both mobility and dropout, as the conceptual framework

[9] Several of the studies were based on the NELS:88 dataset, which asks the parents to indicate the number of non-promotional school changes from grades 1-8. These studies are unable to disentangle the effects of mobility during elementary school and mobility during middle school. In our review, we included these predictors in the elementary school category.

suggests, which means there is no causal effect of mobility. Nonetheless, even studies that control for a host of preexisting factors, such as student achievement, conclude that there is at least some causal association between mobility and educational performance (Pribesh & Downey, 1999).

Attainment. Graduating from high school presents an aspect of educational attainment. Another related aspect is promotion from one grade level to another. At the high school level, students must earn a sufficient number of credits toward graduation in order to be promoted from one grade to another, such as from ninth grade to 10th grade.[10] Students who do not earn sufficient credits are retained in grade level. Although no national data exist on *retention* in high school, data from Texas show that 16.5 percent of ninth graders were repeating that grade level in 2005-06 (Texas Education Agency, 2007, Table 3). Retention rates for Black and Hispanic students exceeded 20 percent (Texas Education Agency, 2007, Table 5). In some urban school districts, retention rates are even higher. A recent study found that more than one-third of ninth graders from the fall 2001 entering class in the Los Angeles Unified School District failed to get promoted to the 10th grade (Silver, Saunders, & Zarate, 2008).

The research literature finds that retention is a consistent predictor of whether students graduate. Most studies have examined the effect of retention in elementary school or the combined effects of retention in elementary and middle school.[11] Thirty-seven of the 50 of those analyses found that retention in elementary and/or middle school increased the odds of dropping out of high school. Only two analyses examined the effects of high school retention on dropout and neither found any significant effects (Alexander, Entwisle, & Kabbini, 2001; Sweeten,

[10] Course requirements for high school graduation vary from state to state, with most states specifying both the number and types of courses students must pass in order to graduate from high school (Planty et al., 2007).
[11] A number of studies used NELS:88 data that included a variable indicating whether the student was ever retained between grade 1 and grade 8, so we put those students in the elementary school category.

2006), although both studies were based on local samples of data and controlled for a number of other predictors. It should be noted that the fact the retention is a significant predictor of dropping out does not establish a casual relationship. Most studies view retention as an independent or exogenous factor that influences a student's decision to finish or drop out of school, but one study that modeled retention as an endogenous decision based on expected costs and benefits found retention did not exert an independent influence on dropping out (Eide & Showalter, 2001).

These results are consistent with a recent review of 17 studies published between 1970 and 2000 that examined the relationship between retention and dropping out (Jimerson, Anderson, & Whipple, 2002).[12] All 17 studies included in that review found that retention was associated with higher dropout rates and lower graduation rates, although the authors did not identify whether the retention occurred in elementary, middle, or high school.[13]

Another related indicator of retention is *over-age*. Students who are one or two years older than their classmates are identified as over-age. For example, in October 2006, 68 percent of all students enrolled in the ninth grade were 14 years of age or younger (U.S. Census Bureau, 2005, Table 2). The other one-third were 15 years of age or older. Not all students who were over-age were retained—some may have enrolled in kindergarten or first grade at an above-average age. Nonetheless, it is probably safe to say that the majority of over-age students have been retained.

[12] Nine of the studies in that review were included in our review—other studies were from the 1970s and from non-journal sources.

[13] Three of the studies were based on the NELS:88 dataset, where parents were simply asked to identify whether students were retained at each grade level from kindergarten to grade 8. Yet two of the studies based on NELS simply identified any retention that occurred between kindergarten and grade 8 (Rumberger, 1995; Rumberger and Larson, 1998), while the other study used student age as a proxy for retention. One NCES report did find that retention in grades 5-8 had a larger negative impact on dropping out in grades 8-10 than retention in grades K-4 (Kaufman and Bradby, 1992).

Three of the four analyses found that over-age students in high school were significantly more likely to drop out and less likely to graduate than students who were not over-age.

Still another indicator of retention is *age*. Many of the studies that we reviewed were based on two national longitudinal studies of grade cohorts (NELS, HSB). In such studies, students who are older than other students in their grade level are, in effect, over-age (even if they are not directly identified as such) and could have been retained.

Ninety studies examined the relationship between age and dropout or graduation status. At the high school level, 31 of the 57 studies found that older students were more likely to drop out and less likely to graduate than younger students. At the middle school level, 11 of the 33 studies found that older students were more likely to drop out and less likely to graduate than younger students.

Instead of examining the effects of individual student predictors on dropping out, a number of studies combined a series of factors into a composite index of risk. Some studies only included student factors (Connell, 1994; Croninger & Lee, 2001; Lee & Burham, 1992), while other studies included both student and family factors (Benz, Lindstrom, & Yovanoff, 2000; Cabrera & La Nasa, 2001). For example, Croninger and Lee (2001) created an "academic risk" index based on five factors: (1) average middle-school grades below C; (2) retained between grades 2 and 8; (3) educational expectations no greater than high school; (4) sent to the office at least once in the first semester of grade 8; and (5) parents notified at least once of a problem with their child during the first semester of grade 8. They found that about one-third of the students had a least one risk factor and those students were twice as likely to drop out as students with no academic risk factors. All twelve analyses in the five studies found that academic (and in some

cases academic and family) risk was a significant predictor or whether students graduated or dropped out of high school

Behaviors

A wide range of behaviors in the theoretical and empirical research literature has been linked to whether students drop out or graduate from high school. They include behaviors in school as well as activities and behaviors outside of school.

Engagement. In many of the conceptual models, student engagement is one of the most important behavioral precursors to dropping out. Consequently, many empirical studies have examined this factor. Yet the studies vary widely in how they measure this construct. As the earlier discussion pointed out, engagement has several dimensions that include students' active involvement in academic work—such as coming to class, doing homework, exerting mental effort—and in the social aspects of school—such as participating in sports or other extracurricular activities. Consequently, many studies created multiple indicators of student engagement often based on information from student and teacher questionnaires. For example, Finn and Rock (1997) developed nine measures of engagement that represented students' active involvement in class work—such as how often they were absent or tardy, completed their homework, and came to class prepared to learn—and in activities outside the classroom—such as whether they participated in sports or in academically oriented extracurricular activities (e.g., band or debate club).

We identified 694 analyses that investigated the relationship between composite measures of student engagement and whether students dropped out or graduated from high school. Of the 35 analyses that examined student engagement in high school, 24 found that higher levels of engagement reduced the likelihood of dropping out or increased the likelihood of

graduating from high school, while 11 analyses found no significant relationship. Of the 31 analyses that examined student engagement in middle school, 10 analyses found engagement reduced dropout and increased graduation from high school, while 11 of the studies found no significant relationship or a positive relationship. At the elementary level, only one of three analyses found that engagement reduced the odds of dropping out of high school (Alexander et al., 2001).

Some studies investigated the relationship between specific indicators of engagement and dropout or graduation. The most common specific indicator was *absenteeism*. The majority of the 35 analyses that examined the impact of this indicator found that students with higher absenteeism were more likely to drop out and less likely to graduate. At the high school level, 13 of the 19 analyses found a statistically positive relationship between absenteeism and dropout, four analyses found no significant relationship, and two analyses found a statistically negative relationship. At the middle school level, all 13 analyses found a positive relationship and the other eight analyses found no significant relationship. At the elementary school level, one of the three analyses found a significant relationship and two found no significant relationship Alexander, Entwisle, & Horsey,1997).

Another specific indicator of engagement is participation in extracurricular activities. Thirty-three analyses investigated the relationship between extracurricular activities and dropout behavior. This indicator of engagement showed a less consistent relationship with dropout behavior. At the high school level 14 of the 26 analyses found that participation in extracurricular activities reduced the likelihood of dropping out or increased the odds of graduating, while 11 analyses found no significant effect and one study found that participation increased the likelihood of dropping out. At the middle school level, only two out of seven

analyses found that involvement in extracurricular activities reduced the odds of dropping out of high school. Participation in sports, especially among males, shows more consistent effects than participation in other extracurricular activities or participation in extracurricular activities more generally (McNeal, 1995; Pittman, 1991; Yin & Moore, 2004).

Coursetaking. Students must take a prescribed number and specific types of courses to graduate from high school. Students' coursetaking patterns not only determine which academic subjects they will learn, but also the quality of the teachers and the instruction they receive. Research has found that students in the less academically rigorous courses often have the least qualified teachers and receive less rigorous instruction (Gamoran, 1987; Lucas, 1999; Oakes, 1986). Access to higher or lower level courses is often determined by the "tracks" or sequences of courses that students take. High-ability students typically are in the "college track" with access to the most rigorous, college-preparatory curriculum, including access to college-level AP courses. Average-ability students typically are in a general track that can prepare them for two-year and lesser-level four-year colleges, and lower-ability students are typically in a remedial track that can help them meet the requirements for high school graduation and little else.

In addition to academic courses, students can take vocational or what is now more commonly referred to as career-technical education (CTE) courses that prepare them for employment directly after high school or for more advanced vocational programs in community colleges. Proponents of CTE argue that such programs can motivate students to stay in school (Grubb & Lazerson, 2005). A recent study of high school graduates from 2004 found that about 26 percent had completed a college preparatory program, 18 percent had completed a vocational program, and the remaining 56 percent had completed a general curriculum (Planty, Provasnik, & Daniel, 2007).

A number of analyses examined the relationship between coursetaking, mainly in high school, and the propensity to drop out or graduate from high school. Fifteen analyses examined the impact of being in an academic or college track and eight of them found that students in an academic track were less likely to drop out and more likely to graduate. Seven analyses also examined the impact of taking vocational courses in middle and high school. At the high school level, two out of the six analyses found that students who took vocational courses were less likely to drop out, three analyses found no significant effects, and one analysis found that students who took vocational courses were more likely to drop out.

Deviance. To remain in school, students must devote their time and attention to their schoolwork and to their school activities. They must also get along with their teachers and fellow students. But some students engage in a number of deviant behaviors in and out of school that increases their risk of dropping out. These deviant behaviors include misbehaving in school, delinquent behavior outside of school, drug and alcohol use, and sexual activity and teen childbearing. The research literature finds that engaging in any of these behaviors increases the risk of dropping out of school.

Most of the existing research has examined the effects of one or two specific indicators of *deviant behavior* on dropping out. Two exceptions are found in recent, related studies that developed general constructs of deviance based on data from a longitudinal study of 808 fifth-grade students from the Seattle (Washington) Public Schools. One construct was developed from three indicators: drug use, violent behavior, and nonviolent behavior (Battin-Pearson et al., 2000). The other construct was developed from four indicators: school problems, delinquency, drug use, and sexual activity (Newcomb et al., 2002). Controlling for a host of other predictors, including prior academic achievement and family background, both studies found that deviant

behavior at age 14 had a significant and direct effect on early school dropout by age 16, and high school failure (dropout and months of missed school) in grade 12.

The most common indicator of deviant behavior is *school misbehavior*. Forty-nine analyses examined the relationship between misbehavior and dropping out, with most of the analyses focusing on the high school level. Among the 31 analyses at the high school level, 14 found that misbehavior was significantly associated with higher dropout and lower graduation rates; 12 analyses found no significant relationship; and five studies found a negative relationship. Of the 17 analyses at the middle school level, 14 found that misbehavior in middle school was significantly associated with higher dropout and lower graduation rates in high school, whereas three found no significant relationship. The one analysis that focused on the elementary school level found that misbehavior in elementary school increased the odds of dropping out of high school (Ou, Mersky, Reynolds, & Kohler, 2007).

Another indicator of deviant behavior that has been studied in the research literature is *delinquency* or misbehavior outside of school. Nineteen studies examined the relationship between delinquency and dropout. Most of them relied on students' self-reports of delinquent behavior, which typically is based on answers to a series of questions on a spectrum of behaviors that includes fighting, stealing, selling drugs, damaging property, and attacking someone.[14] The studies also identified whether students were arrested and whether their crimes were adjudicated through the court system. One of the challenges in these and other studies of out-of-school behaviors is whether the behavior, in this case delinquency, is causally related to dropping out, or whether both behaviors are caused by a common set of underlying factors. That is, delinquent adolescents may differ from their non-delinquent peers in ways that may not be easily identified or measured in empirical studies, which could result in biased estimates of the effects of

[14] See Hannon (2003, p. 580) for a typical list of items.

delinquency on dropout behavior. To address this concern, researchers utilize a variety of statistical controls and techniques to derive more accurate estimates. The most rigorous techniques involved using longitudinal data to select non-arrested youth and measure their student characteristics at an initial point in time, to identify delinquent behavior at a later point in time, and then to determine dropout status at a still later point in time (Sweeten, 2006). Such a technique establishes a more causal sequencing of the connection between delinquency and dropout. Nonetheless, the technique still cannot control for other, unobserved differences between delinquent and non-delinquent youth.

Eleven of the 19 analyses found that delinquent youth were more likely to drop out of school than non-delinquent youth. But three of the four studies that examined involvement in the justice system found that being arrested had a separate and generally larger effect on dropping out of school than delinquency (Bernburg & Krohn, 2003; Hannon, 2003; Sweeten, 2006), although Sweeten (2006) found that involvement in court after being arrested was a much stronger predictor of dropout than simply being arrested with no court involvement.

Another indicator of deviant behavior that has been studied in the research literature is *drug and alcohol use*. Forty-two analyses examined the relationship between drug and alcohol use and dropout. Of the 23 of these analyses that focused on high school behavior, 17 found that drug or alcohol use during high school was associated with higher dropout rates, whereas 11 of the 19 middle school analyses found that drug or alcohol use during middle school was associated with higher dropout rates. Since alcohol, drug, and tobacco use are often correlated, some studies have attempted to determine whether some of these activities are more detrimental than others. Two studies found that tobacco use during middle school had a direct effect on the odds of dropping out, while drug (marijuana) use did not (Ellickson, Bui, Bell, & Mcguigan,

1998; Battin-Pearson et al., 2000). Another study found that both marijuana and tobacco use had direct effects on dropping out, but marijuana use had the stronger effect (Bray, Zarkin, Ringwalt, & Qi, 2000).

A final indicator of deviant behavior that has been studied in the research literature is *teen parenting and childbearing*. The research literature generally finds that teenage parenthood, and particularly teenage childbearing among adolescent females, is related to a series of negative socioeconomic consequences, including low educational attainment and earnings, and higher rates of poverty and welfare (Conley & Chase-Lansdale, 1998; Grogger & Bronars, 1993). The major challenge in this research is to establish a causal connection between teenage childbearing and dropout behavior. In other words, does teenage childbearing cause adolescent females to drop out, or are there other unobservable factors that contribute to both childbearing and dropping out of school? To try to estimate the causal connection between childbearing and dropout behavior, social scientists have employed a number of innovative techniques, including comparing the educational outcomes of sisters who had children as teenagers, with those who did not (e.g., Hoffman, Foster, & Furstenberg, 1993) and comparing the educational outcomes of teen mothers with teens who miscarried (e.g., Hotz, McElroy, & Sanders, 2005).[15]

We identified 66 analyses that investigated the relationship between teen parenting and childbearing and high school dropout. Most of the studies examined the effects of parenting and childbearing during high school. Of the 62 analyses that focused on high school predictors, 50 found that teenage parenting and childbearing increased the odds of dropping out or reduced the odds of graduating. In studies that compared males and females, teenage parenting had more serious consequences for females than for males (Fernandez, Paulsen, & Hirano-Nakanishi, 1989). Some studies also found the impact was more detrimental among Black females than

[15] See Hotz (2005) for a discussion of the relative merits of the various approaches.

among White or Hispanic females (Grogger & Bronars, 1993; Forste & Tienda, 1992). Two studies that used more advanced statistical techniques to control for unobserved differences between teen mothers and girls who delayed childbearing until adulthood (age 20 or greater), found smaller, but still significant effects in at least some of their analyses, compared to studies that only controlled for observed differences (Grogger & Bronars, 1993; Hoffman et al., 1993). However, two other studies that compared teen mothers with teens who miscarried did not find that teenage childbearing had a statistically significant effect on obtaining a high school diploma (Hotz, Mullin, & Sanders, 1997; Hotz et al., 2005).

Peers. A number of studies have examined the relationship between peers and dropout. Peers may influence students' social and academic behaviors, attitudes toward school, and access to resources (social capital) that may benefit their education (Ream, 2005; Stanton-Salazar, 1997). Twenty analyses examined the relationship between peers and dropout or graduation. The findings are mixed, in part, because studies have measured peer relationships in different ways. Some studies examined students' perceived popularity, with one study finding no effect (Cairns, Cairns, & Necherman, 1989) and two other studies finding that students who perceived themselves to be popular and important among their peers in eighth grade were actually *more* likely to drop out of school by tenth grade, after controlling for a host of other factors (Rumberger, 1995; Stearns, Moller, Blau, & Potochnick, 2007). Other studies found that generally having friends (Fagan & Pabon, 1990) or having friends who are interested in school (Pittman, 1991) reduces the odds of dropping out. The most consistent finding is that having deviant friends—friends who engage in criminal behavior, for instance (Battin-Pearson et al., 2000; Kaplan, Peck, & Kaplan, 1997)—or friends who have dropped out (Saiz & Zoido, 2005;

Cairns et al., 1989; Carbonaro, 1998) increases the odds of dropping out, with such associations appearing as early as the seventh grade.

Employment. Employment during high school is widespread in the U.S. A study of 2002 high school sophomores found that 26 percent were working, and six percent reported working more than 20 hours per week (Cahalan, Ingles, Burns, Planty, & Daniel, 2006). Employment rates among 16-17 year-olds exceeded 30 percent in 2000 (Warren & Cataldi, 2006). Although working during high school may impart valuable experience as well as provide income to students, working too much can interfere with participating in school and in doing homework (Greenberger & Steinberg, 1986). A large body of research has examined the relationship between high school employment and a wide range of outcomes, including work-related outcomes (e.g., work attitudes and motivation), family-related outcomes (e.g., participation in family activities), school-related outcomes (grades, absenteeism, engagement), and deviancy (Zimmer-Gembeck & Mortimer, 2006). One of the challenges in conducting this research, as noted previously in studies of other behaviors, is establishing a causal connection between employment and these outcomes. Students who choose to work may differ from their non-working peers in observed and unobserved ways that make it difficult to establish whether work itself contributes to these outcomes. For example, studies have found that students who work are generally less engaged in school prior to working (Shanahan & Flaherty, 2001; Warren, 2002), so working may be as much a symptom as a cause of subsequent outcomes. To address this problem, some researchers have used longitudinal designs and statistical techniques to better establish the causal linkage between working and subsequent outcomes (Lee, 2007; Marsh & Kleitman, 2005; Zimmer-Gembeck & Mortimer, 2006).

We identified 37 analyses that examined the impact of high school employment on the propensity to drop out of school. The major focus of most studies was examining whether working more hours increased the odds of dropping out of school. Although one study found that employed students, as a group, are more likely to drop out (McNeal, 1997a) and another study found that the number of hours worked was a significant predictor of dropping out (Marsh, 1991), several studies found that only students who worked more than 20 hours a week were significantly more likely to drop out (D'Amico, 1984; Goldschmidt & Wang, 1999; Perreira, Harris, & Lee, 2006; Warren & Lee, 2003; Warren & Cataldi, 2006). Interestingly, some studies actually found that students who worked fewer than 20 hours (D'Amico, 1984), or fewer than seven hours (McNeal, 1995), or more consistently throughout their high school careers (Zimmer-Gembeck & Mortimer, 2006), were actually less likely to drop out of school, compared to students who worked more hours or did not work at all. And one study found that among a sample of dropouts, those who were employed prior to dropping out were more likely to complete high school by age 22 (Entwisle, Alexander, & Olson, 2004). Also, some studies found that the impact of working in high school varies by race, gender, and the type of job held (D'Amico, 1984; McNeal, 1997a; Perreira et al., 2006; McNeal, 1997a) while other studies found similar effects among gender, racial, and academic backgrounds of students and local labor market characteristics (Warren & Cataldi, 2006).

One recent study examined the impact of work intensity by "matching" students with similar propensities to work more than 20 hours a week using a variety of background characteristics measured before students began working in grades 9 and 10 (Lee, 2007). The authors found that the odds of dropping out were 50 percent higher for students who worked more than 20 hours per week than if they had worked less, but working more than 20 hours a

week did not affect the odds of dropping out for those students who had a high propensity to work long hours in the first place.

Attitudes

Students' beliefs, values, and attitudes are related to both their behaviors and to their performance in school. These psychological factors include motivation, values, goals, and a range of students' self-perceptions about themselves and their abilities. These factors change over time through students' developmental periods and biological transformations, with the period of early adolescence and the emergence of sexuality being one of the most important and often the most difficult period for many students:

> For some children, the early-adolescent years mark the beginning of a downward spiral leading to academic failure and school dropout. Some early adolescents see their school grades decline markedly when they enter junior high school, along with their interest in school, intrinsic motivation, and confidence in their intellectual abilities. Negative responses to school increase as well, as youngsters become more prone to test anxiety, learned helplessness, and self-consciousness that impedes concentration on learning tasks (Eccles, 1999, p. 37).

Although there is a substantial body of research that has explored a wide range of student beliefs, values, and attitudes (Eccles & Wigfield, 2002), far less research has linked them to student dropout. Most existing studies have examined some specific attitudes, such as students' educational expectations ("How many years of schooling do you expect to complete?") or self-perceptions, such as self-esteem, self-concept, or locus of control.

One exception is a detailed longitudinal study of a cohort of first-grade students from the Baltimore Beginning School Study (BSS) that began in the fall of 1982 (Alexander et al., 2001). That study collected a wide range of attitudinal and behavioral information on students in grades 1-9 from student self-reports, teachers' reports, and school report cards. The attitudinal information included self-expectations for upcoming grades, educational attainment, self-ability

and competence, and measures of psychological engagement ("likes school") and school commitment.[16] The attitudinal items (as well as the behavioral items) were all combined into a single construct for grade 1, grades 2-5, grades 6-9, and grade 9. This allowed the researchers to examine not only the relative effects of student attitudes and behaviors overall relative to other predictors, but also their relative effects over different grade levels or stages of schooling. The authors found that while the effects of behavioral engagement on school dropout appear in grade 1, even after controlling for the effects of school performance and family background, student attitudes do not demonstrate a separate effect on school dropout until grade 9, with behavioral engagement still showing the stronger effect (Table 9). Interestingly, the authors also find that the correlation between attitudes and behaviors increases from grade 1 to grade 9 (p. 796).

Goals. To be successful in school, students have to value school. That is, they have to believe that it will be instrumental in meeting their short-term or long-term goals (Eccles & Wigfield, 2002).

Although scholars have identified a large number of goals, the research literature on school dropouts has generally focused on a single indicator—*educational expectations*. This indicator is most commonly measured by the answer to a single question: How far in school do you think you will get? The answers range from not completing high school to completing graduate school. This question not only represents an educational goal, but it also reflects students' expectations for achieving that goal. We identified 82 analyses that examined the relationship between educational expectations and school dropout. At the high school level, 33 of the 41 analyses found that higher levels of educational expectations were associated with lower dropout rates. At the middle school level, 23 of the 38 analyses found the same

[16] For a detailed discussion of all the items, see pp. 810-812.

relationship. Three analyses examined educational expectations in elementary school and none found a significant effect on high school dropout or graduation.

Self-perceptions. To be successful in school, students not only must value school, they must believe they are capable of achieving success. Students' perceptions of themselves and their abilities are a key component of achievement motivation and an important precursor of student engagement (National Research Council, Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004).

Research studies have examined a number of self-perceptions and their relationship to high school dropout and graduation. All of these perceptions are constructed as composite measures based on student responses to a number of questions about themselves. One such construct is self-concept. Self-concept is basically a person's conception of himself or herself (Bong & Skaalvik, 2003). Although self-concept can be viewed and measured as a general construct, scholars have come to realize that it is multidimensional and that it should be measured with respect to a particular domain, such as academic self-concept or self-concept with respect to reading. A related construct is self-esteem, which measures self-assessments of qualities that are viewed as important (Bong & Skaalvik, 2003). Another construct is locus of control, which measures whether students feel they have control over their destiny (internal control) or not (external control). Relatively few studies have found a direct relationship between any of these self-perceptions and dropping out. The most studied has been locus of control. Of the 22 analyses of locus of control, only three analyses in three studies found a significant relationship with dropout, with students who had an external locus of control—the feeling of little control over one's destiny—showing a higher propensity to drop out (Ekstrom,

Goertz, Pollack, & Rock, 1986; Rumberger, 1983), even as early as first grade (Alexander, Entwisle, & Horsey, 1997).

Background

A number of student background characteristics are linked to whether students drop out or graduate. They include demographic characteristics, past performance in school, and other experiences. Because past performance was discussed earlier, below we focus on demographics and past experiences.

Demographics. Dropout and graduation rates vary widely by a number of demographic characteristics of students. For instance, dropout rates are higher for males than for females, and they are higher for Blacks, Hispanics, and Native Americans than for Asians and Whites (Laird et al., 2007). Yet those differences may be related to other characteristics of students as well as characteristics of their families, schools, and communities. As a result, the relationship between demographic factors and school dropout in multivariate studies depends on what other factors are included in the analysis.

This is clearly the case with respect to gender. Almost 200 analyses examined the relationship between gender and high school dropout and graduation. At the high school level, 27 analyses found that females had higher dropout rates or lower graduation rates, 55 analyses found no significant relationship, and 20 analyses found that females had lower dropout rates or higher graduation rates. One study illustrates how the relationship is affected by other factors in the analysis. The author found no significant relationship between gender and dropout after controlling for family and academic background, but found that females had higher dropout rates after controlling for a variety of attitudes, behaviors, and indicators of educational performance in eighth grade (Rumberger, 1995). In general, studies in which the researchers only controlled

for background characteristics showed that females had lower dropout rates or that there was no significant relationship; whereas studies in which the researchers controlled for attitudes, behaviors, and performance in school showed that females had higher dropout rates.

The relationship between gender and dropout behavior sometimes varies among subpopulations of students. For example, in a study based on the Panel Study of Income Dynamics (PSID) data, Crowder (2003) found that when using the entire sample, and in a sub-sample of Whites, females had lower dropout rates; but in a sub-sample of Blacks, females had significantly higher dropout rates. Lichter (1993) found that females had lower dropout rates when using the entire sample of Census data and among sub-samples of persons in central cities and suburbs, but higher dropout rates in rural areas.

Ethnicity and race represent another instance of how other factors affect the relationship of these characteristics with dropout behavior. More than 200 analyses have examined the relationship between ethnicity and race and school dropout. Most studies created a series of indicator (dichotomous) variables for each major racial or ethnic group, using non-Hispanic Whites as the comparison group. Of the 162 analyses that examined differences in dropout and graduation rates between Whites and Blacks at the high school level, 53 found no significant relationship, five found that Blacks had higher dropout rates, and 38 found that Blacks had lower dropout rates independent of the other factors in the analyses. Of the 79 analyses that examined differences in dropout and graduation rates between Whites and Hispanics at the high school level, 52 found no significant relationship. These studies suggest that the observed relationship between dropout rates and ethnicity and race can often be explained by other factors, such as family background or educational performance.

Another demographic characteristic that has been examined in the research literature is immigration status. More than 20 percent of elementary and secondary students are foreign-born or have foreign-born parents (Shin, 2005, Table 8). Foreign-born students have higher dropout rates than native-born students (Laird et al., 2007, Tables 1 and 6). Twenty-six analyses examined the relationship between immigration status and dropout. Most analyses compared first generation (foreign-born) and second generation (one parent foreign-born) with third generation (native-born students and parents). Some analyses examined the effects of immigration status on dropout for the entire population of students, while other studies examined its effects on different racial and ethnic sub-groups. One study of an entire population of high school sophomores found that second generation students had lower dropout rates than either first or third generation students (White & Kaufman, 1997), while another study (Rumberger, 1995) of an entire population of eighth-grade students found no differences in dropout rates between grades 8 and 10 by immigration status, after both studies controlled for family background characteristics. But the effects of immigration status vary among ethnic and racial groups. Four studies found that second generation—and, in one study, early first generation (under age six at arrival)—Hispanics had lower dropout rates than third generation Hispanics (Driscoll, 1999; Perreira et al., 2006; Rumberger, 1995; Wojtkiewicz & Donato, 1995). Two studies found that the effect of nativity varied among Hispanic sub-groups—one study found that recent immigrants had higher dropout rates among Chicanos and Puerto Ricans, but lower dropout rates among Cubans (Velez, 1989), while the other study found lower graduation rates among foreign-born Mexicans, but not among other Hispanic subgroups (Wojtkiewicz & Donato, 1995). Another study also found lower graduation rates among foreign-born compared to second and third generation Mexicans (Zsembik & Llanes, 1996). Yet another study found no

differences among Hispanic or nativity sub-groups after controlling for family socioeconomic status (Lutz, 2007).

Scholars have advanced a number of explanations of how and why immigration affects high school completion. Some researchers attribute the higher graduation rates among second generation students to these students having higher English skills than immigrant students, but also more optimism and motivation than third generation students (Kao & Tienda, 1995). Others argue that differences in educational outcomes among immigrant groups can be explained by differences in social capital found in families, schools, and communities (Perreira et al., 2006).

Closely related to immigration status is English language proficiency. Most immigrants come from non-English-speaking countries, so proficiency in English is not only an important skill for fully participating in school and the larger society, it is also a marker of acculturation (Gibson, 1997). This is especially true because few schools provide primary language instruction and effective bilingual education programs (Rumberger & Gándara, 2008). An earlier review of the literature on dropping out among language minority youth found no empirical studies that examined the direct relationship between language proficiency and high school dropout (Steinberg, Blinde, & Chan, 1984). Our review identified six such studies and 13 separate analyses. Three studies found that students with higher English language proficiency had lower dropout rates, after controlling for a wide variety of additional factors (Griffin & Heidorn, 1996; Perreira et al., 2006; Zsembik & Llanes, 1996), although another study found no significant effects of English language proficiency on dropout rates among Hispanic youth (Driscoll, 1999). Still another study found that biliterate Hispanics not only had higher graduation rates than other English-proficient and Spanish-dominant Hispanics, but also higher graduation rates than non-Hispanic Whites, after controlling for other factors (Lutz, 2007).

A final demographic characteristic is disability status. Students with disabilities have much higher dropout rates than students without disabilities. For example, data from NELS:88 show that the dropout rate for students with learning disabilities (LD) was 26 percent and the dropout rate for students with emotional or behavioral disorders (EBD) was 50 percent, while the dropout rate for students without disabilities was 15 percent (Reschly & Christenson (2006, Table 1). Yet like other demographic factors, the effects of disabilities are mediated by other factors. One study found that higher dropout rates among students with learning disabilities were explained by test scores and high school grades (Powell & Steelman, 1993).

Health. Good mental and physical health may be both a cause and a consequence of dropping out. Research has clearly shown that high school graduates have better health and incur lower health care costs than high school dropouts (Belfield and Levin, 2007). But poor health may also contribute to dropping out.

We identified seven studies and eight analyses that examined the relationship between health and dropout (Daniel et al., 2006; Farahati, Marcotte, & Wilcox-Gok, 2003; Hagan & Foster, 2001; Menning, 2006; Roebuck, French, & Dennis, 2004; South, Haynie, & Bose, 2007; Stevenson, Maton, & Teti, 1998). One study of more than 15,000 adolescents from the National Household Survey on Drug Abuse found that respondents who reported that they had excellent or very good health were less likely to drop out than respondents who reported good, fair, or poor health, net of other predictors (Roebuck et al., 2004). Six other studies examined the relationship between adolescent mental health and dropout. Five of the studies—three from a national study of more than 10,000 adolescents (Add Health)—found that adolescents who reported symptoms of depression (feeling depressed, lonely, sad, etc) were more likely to drop out, even after controlling for a number of other factors, including academic performance and

family background (Daniel et al., 2006; Farahati, Marcotte, & Wilcox-Gok, 2003; Hagan & Foster, 2001; Menning, 2006; South et al., 2007). One study found that depression did not predict dropping out among a sample of 119 pregnant adolescents (Stevenson et al., 1998)

Past experiences. Students' past experiences may influence whether students drop out or graduate, largely through effects on their attitudes, behaviors, and educational performance.

One particular experience, participation in *preschool*, has been the subject of extensive research. A growing body of evidence has found that high quality preschool can not only improve school readiness and early school success, but long-term follow-up studies have found that preschool can also improve a wide range of adolescent and adult outcomes, including high school completion, and less criminal activity, reliance on welfare, and teen parenting (Barnett & Belfield, 2006; Gorey, 2001). Despite the large number of studies of preschool more generally, relatively few studies have examined effects on high school dropout and graduation. One review reported that three "intensive" high quality preschool programs—two of which were evaluated with randomized designs—improved graduation rates from 15 to 20 percentage points (Barnett & Belfield, 2006, p. 84). Another review of seven studies found that, on average, preschool participation improved graduation rates by 22 percentage points (Gorey, 2001, Table 3).

We identified 12 analyses in 10 studies that examined the effects of preschool participation on high school dropout and graduation rates. All but two of the studies analyzed the same set of data from the Chicago Longitudinal Study (CLS), an ongoing study of children who participated in preschool and early childhood services from ages 3-9 beginning in 1986. The studies found that after controlling for differences in gender, an index of family risk factors, and race/ethnicity, students who participated in the preschool portion of the program had graduation rates about 10 percentage points higher than non-program participants (Reynolds et

al., 2004, Table 3). Several of the studies sought to identify what mediating factors accounted for the program effects. One study found that the program effects were no longer significant after controlling for a single index of socio-emotional maturity, based on questions about the extent to which the child works and plays well with other children, complies with classroom rules, and comes to school ready to learn (Barnard, 2004). Another study found that the program effects were no longer significant after controlling for retention and school mobility (Temple, Reynolds, & Miedel, 2000, Table 6). Two other studies developed and tested more complex structural equation models to examine the effects of the program on a wide range of mediators (Ou, 2005; Reynolds et al., 2004). The studies found that about 90 percent of the program effects were explained by cognitive advantage in early elementary school, improved family support, and improved school support. One study found that participants in an intensive home-based intervention program, the Pittsfield Parent-Child Home Program, were less than half as likely to drop out of school compared to a randomized control group (Levenstein, et al., 1998). The final study that used a national dataset, the PSID, did not find any benefits of attending preschool in general (Haveman, Wolfe, & Spaulding, 1991).

Institutional Predictors

While a large array of individual attitudes, behaviors, and aspects of educational performance influence dropping out and graduating, these individual factors are shaped by the institutional settings where children live. This latter perspective is common in such social science disciplines as economics, sociology, and anthropology, and more recently has been incorporated in an emerging paradigm in developmental psychology called *developmental behavioral science* (Jessor, 1993). This paradigm recognizes that the various settings or contexts

in which children live—families, schools, and communities—all shape their attitudes, behaviors, and experiences. This framework was used, for example, by the National Research Council Panel on High-Risk Youth, which concluded that too much emphasis has been placed on "high-risk" youth and their families, and not enough on the high-risk settings in which they live and go to school (National Research Council, Panel on High-Risk Youth, 1993). Similarly, a recent review of the literature on childhood poverty identified a wide variety of family, school, and community environmental factors that impede the development of poor children (Evans, 2004). Both reviews reflect the growing emphasis on understanding how these contexts shape educational outcomes.

Empirical research on dropouts has identified a number of factors within students' families, schools, and communities that predict dropping out and graduating.

Families

Family background has long been recognized as the single most important contributor to success in school (Coleman et al., 1966; Jencks et al., 1972). Research has attempted to identify what aspects of family background matter and how they influence school achievement (Hoover-Dempsey & Sandler, 1997; Pomerantz et al., 2007). While much of this research has focused on the effects of family background on academic achievement, a sizeable body of research has investigated the effects of family background on student dropout and graduation. The research has identified three aspects of families as most important: (1) family structure, (2) family resources, and (3) family practices.

Structure. One of the most widely studied features of families is its structure. Family structure generally refers to the number and types of individuals in a child's household. Family structure affects the physical, social, and cognitive development of children through its

relationship to other features of families, particularly its resources and practices. For example, single-parent families, particularly female-headed families, have lower incomes and are more likely to depend on public assistance. In 2007, 40 percent of children living with their mother only had a family income below 100 percent of the poverty level, compared to nine percent of children living with both parents (U.S. Census Bureau, 2007, Table C8). Family practices that promote school achievement, such as monitoring and supervision, are also lower in single parent and stepfamilies, compared to two-parent families (Astone & McLanahan, 1991).

Two related indicators of family structure have been investigated in the dropout literature—one measuring whether students live with both parents, and the other measuring whether students do not live with both parents. We identified 220 analyses investigating the relationship between these two indicators and whether students dropped out or graduated from high school (see Table 3). Overall, more than half (115) of the analyses found that students living with both parents had lower dropout rates and higher graduation rates, compared to students living in other family living arrangements. Studies that have investigated specific living arrangements, such as single-parent families and stepfamilies, generally find that they have similar impacts on dropping out (e.g., Astone & McLanahan, 1991; Perreira et al., 2006; Rumberger, 1995) .

Other studies have examined the effects of changes in family structure, which the research literature has shown can have profound and devastating effects on the economic, emotional, and social needs of children (Seltzer, 1994). One study found that changes in family structure before the age of four actually increased high school graduation, while changes after that age reduced the high school graduation rate (Garasky, 1995). Another study found that a change in family composition had no direct effect on either early (grade 8-10) or later (grade 10-

12) dropout, although the study controlled for other related events, such as family moves and changing schools (Swanson & Schneider, 1999). A third study found that students who changed from living with both parents as eighth-graders, to living with only their mother or father four years later, were more likely to drop out of high school during the same four-year period (Pong & Ju, 2000). One reason such changes can lead to higher dropout and lower graduation rates is because they lower parental monitoring and supervision (Astone & McLanahan, 1991); another is that they can lead to lower family incomes (Pong & Ju, 2000). Four other studies (two based on the same data) included changes in family structure along with other potentially stressful events (such as a family move, illness, death, adults entering and leaving the households, and marital disruptions) in a composite family stress index, with each study finding that family stress increased the odds of dropping out (Alexander et al., 1997; Alexander et al., 2001; Garnier et al., 1997; Haveman et al., 1991). A related measure of family stress—poor maternal mental health—has also been linked to dropout (Bohon, Garber, & Horowitz, 2007; Ensminger, Hanson, Riley, & Juon, 2003).

Changes in family structure can result in residential mobility. For example, in a study from 2005-06, children ages 6-17 living in a female-headed household were twice as likely to change residences than children living in married-couple (not necessarily two biological parents) families (U.S. Bureau of the Census, 2007, Table 15). Of course, residential mobility is widespread, with 11 percent of all school-age children changing residences each year (Ibid.), and it occurs for many reasons. It has also been the subject of considerable research. The research has found that mobility can be a stressful event for both adults and children, although it is often linked to problematic situations prior to moving itself, making the causal impact of residential mobility hard to detect (Humke & Schaeffer, 1995). Residential mobility is also associated with

school mobility (Rumberger & Larson, 1998), whose effects we reviewed earlier. Both residential and school mobility can disrupt valuable social relationships for adults and children—so-called social capital (see discussion below)—that can impair family functioning and student school success (Ream, 2005).

We identified 30 analyses that examined the relationship between residential mobility and student dropout (Table 2). Twenty-four of the analyses found that residential mobility is associated with an increased risk of dropping out of school. Residential mobility at any grade level tends to increase the risk of high school dropout, with the risk increasing with each additional move. Even frequent moving before beginning elementary school appears to be detrimental (Ensminger et al., 2003).[17]

Another structural feature of families is family size. We identified 120 analyses that investigated the relationship between family size—measured by the number of siblings or the total number of family members in the household—and high school dropout and graduation. About half (72) of the studies found that the odds of dropping out were higher in larger families compared to smaller families. Larger families may have fewer resources per family member to support education.

We identified 47 analyses that examined the relationship between maternal employment and school dropout. Two studies found a positive relationship and six studies found a negative relationship, with the remainder finding no significant relationship.

Resources. Another important family attribute is resources. Resources provide the means to promote the emotional, social, and cognitive development of children. Research has identified several types of family resources and how they impact child development. They

[17] This study found that three or more residential moves between birth and first grade increased the odds of dropping out by about 70% for both girls and boys, independent of other factors.

include: (1) *financial resources* that can provide the means to provide a richer home environment (more books, computers) and access to better schools and supplemental learning opportunities (after-school and summer programs, tutors, etc.); (2) *human resources* of parents, as reflected in their own education, that provide the means to directly improve the cognitive development of their children through reading, helping with homework, etc. and to influence their children's motivation and educational aspirations; and (3) *social resources,* which is manifested in the relationships parents have with their children, other families, and the schools, and influences student achievement independent of the effects of human and financial capital (Coleman, 1988).

The most widely used indicator of family resources is *socioeconomic status* (SES), which is typically constructed as a composite index based on several measures of financial and human resources, such as both parents' years of education, both parents' occupational status, and family income.[18] We identified 95 analyses that investigated the relationship between SES and high school dropout or graduation (Table 3). At the high school level, 27 of the 48 analyses found that students from high SES families are less likely to drop out than students from low SES families; and at the middle school level, 33 of the 38 analyses found that higher SES lowers the risk of dropping out. The results are more consistent in studies based on a representative sample of the population. Two studies based on the HSB data, for example, found that SES was a significant predictor of dropout among Whites, but not among Blacks or Hispanics (Ekstrom et al., 1986; Fernandez et al., 1989), although another study based on the same data found significant effects among all three group (Velez, 1989).

Many studies rely on specific indicators of human or fiscal resources within families. One such indicator is *parental education*. Of the total of 102 studies that examined the

[18] This is the index used in NELS:88, one of the most common sources of data in the studies identified in our review (Ingels, Scott, Lindmark, Frankel, and Myers, 1992).

relationship between parental education—measured as a single variable indicating low to high levels of parental education—two-thirds (67) found that higher levels of parental education were associated with lower dropout rates and higher graduation rates. Some studies used one or more indicator variables to identify specific levels of parental education. For example, 19 of the 26 analyses that used an indicator of whether the household head did not complete high school found that students in such families were more likely to drop out. Similarly, 13 of the 17 analyses that used an indicator of whether the household head completed college found that students in such families were less likely to drop out.

A third common indicator of family resources is *family income*. We identified 110 analyses that examined the relationship between family income and high school dropout or graduation; overall, about half of the analyses found a significant relationship. At the high school level, 35 of the 60 analyses found that students are less likely to drop out from high-income families than from low-income families. At the middle school level, 17 of the 40 studies found that family income had a negative effect on dropout (high income associated with lower dropout rates); and eight of the 19 analyses also found a negative effect at the elementary level.

Instead of examining the relationship between individual family predictors and school dropout, some studies have created composite measures of several indicators to determine their combined effects. For example, Croninger and Lee (2001) created a social risk index based on five attributes of students and their families: (1) disadvantaged minority (Black, Hispanic, or Native American), (2) linguistic minority, (3) household poverty, (4) single-parent household, and (5) mother or father failed to complete high school. They found that the odds of dropping out of high school were 66 percent higher for students with at least one risk indicator, compared

to students with no risk indicator, even after controlling for both eighth and tenth grade achievement and behaviors.

Practices. Fiscal and human resources simply represent the means or the capacity to improve the development and educational outcomes of children. This capacity is realized through the actual practices and behaviors that parents engage in. These practices, manifested in the relationships parents have with their children, their schools, and the communities, is what sociologist James Coleman (1988) labeled *social capital*. Other researchers have labeled such practices *parental involvement* or *parenting style* (Fan & Chen, 2001; Jeynes, 2007; Pomerantz et al., 2007; Spera, 2005).[19] Although earlier we suggested that parenting practices could be considered a form of resources or capital, we believe they more rightly fall into the category of practices.

We identified almost 100 analyses that examined the relationship between parenting practices and school dropout. Reflecting the broad array of specific parenting practices that have been identified in the research literature, these practices include parental educational expectations (how much schooling they want or expect their children to get), within-home practices (supervision, helping with or monitoring homework), and home-school practices (participation in school activities, communication with the school).

The single most common indicator of parenting practices is parental expectations—how much education parents want or expect their children to attain. Twenty-nine studies examined the relationship between parental expectations and dropout behavior, with 15 of them finding that higher parental expectations were associated with lower dropout and higher graduation rates. Sixty-five analyses examined the relationship between other aspects of parenting practices and

[19] Spera (2005) discusses the distinction between parenting practices and parenting styles.

dropout behavior, with half (34) finding that positive parenting practices decreased the risk of dropping out.

Several studies examined multiple indicators of parenting practices at the secondary level. In an early study of 1980 high school sophomores using HSB data, Astone (1991) found that four parenting practices (as reported by the students) during high school had significant effects on whether students dropped out or graduated: (1) whether their mother wanted them to graduate from college, (2) whether their mother monitored their school progress, (3) whether their father monitored their school progress, and (4) whether their parents supervised their school work. In a more recent study of eighth graders from 1988 (NELS:88 data), Carbonaro (1998) also found four parenting practices that predicted whether students dropped out by grade 12: (1) parental educational aspirations for their child in grade 8, (2) parental participation in school activities in grade 8, (3) parental communication with the school in grade 12, and (4) a measure of intergenerational closure—how many parents of their children's friends do they know—which is a key component of social capital that provides a source of information, norms, expectations, standards of behavior. Using the same dataset as Carbonaro, Stone (2006) examined the effects of the changes in three composite measures of parental involvement—home communication about school, monitoring, and direct parent interaction with the school—between grades 8 and 10, and found that only one—a decrease in home communication—increased the odds of dropping out by a very modest five percent. In a study of students enrolled in grades 7-12 in 1994-95 (Add Health data), Perreira (2006) found that higher levels of parental closeness (closeness, satisfaction, warmth, and satisfaction with parental communication) lowered the odds of dropping out only among White, but not among Asian, Black, or Hispanic students; while increased monitoring (curfew, limits on TV, etc.) had no significant effect on any group.

Of the 15 analyses of parenting practices at the elementary level, 12 found significant effects, although several of them were based on the same data. The studies based on data from the Chicago Longitudinal Study all found that higher participation in school activities during grades 1-6, as reported by the teacher, increased the odds of completing high school (Barnard, 2004; Ou, 2005; Reynolds et al., 2004).

An indirect indicator of family environment more generally is whether a sibling dropped out. Four of the five studies that examined this indicator found that students were more likely to drop out if they had a sibling who dropped out (Rumberger & Thomas, 2000; Teachman, Paasch, & Carver, 1996; Jacob, 2001; Teachman, Paasch, & Carver, 1997).

Schools

It is widely acknowledged that schools exert powerful influences on student achievement, including dropout rates. But demonstrating how much influence schools exert and identifying the specific school factors that affect student achievement presents some methodological challenges. The challenge is underscored by the fact that students in the U.S. are highly segregated by race, ethnicity, family background, and prior achievement, which leads to widespread differences in observed school outcomes (Orfield & Lee, 2005). Yet at least some of these differences in school outcomes are due to differences in the background characteristics of students, not the effectiveness of the schools. Fortunately, recent developments in statistical modeling have allowed researchers to more accurately estimate how much schools influence student achievement school effects after controlling for the individual background characteristics of students (Lee, 2000; Raudenbush & Willms, 1995). These developments have demonstrated that although student and family characteristics can explain most of the variability in student achievement, about 20 percent of the variability in student outcomes can be attributed to the

characteristics of the schools that students attend.[20] Research has also shown that about five percent of the variability in student outcomes can be attributed to states.[21]

Researchers have used a variety of data and statistical techniques to assess the effects of school-level variables. Many studies are based on multi-level datasets, such as NELS and HSB, that include samples of students within schools, which enable researchers to disentangle student-level and school-level effects. But a number of other studies use data at the district and state levels, sometimes in conjunction with individual-level and school-level data (Li, 2007; Lillard & DeCicca, 2001; Loeb & Page, 2000; Warren, Jenkins, & Kulick, 2006). Such studies attempt to examine the effects of district-level and state-level characteristics, such as compulsory schooling laws and state graduation requirements. All of the studies of school-, district-, and state-level effects face the same problem as individual-level studies: establishing a causal relationship between the variable of interest and dropout or graduation rates. In particular, it is difficult to control for unobserved factors that may be correlated with the predictor variable as well as the outcome variable. As in the individual-level situation, researchers use a number of techniques to make strong causal inferences (Schneider et al., 2007).

Four types of school characteristics have been shown to influence student performance, including dropout and graduation rates: (1) student composition or characteristics of the student body, (2) resources, (3) structural characteristics, and (4) processes and practices. The first three

[20] Rumberger and Palardy (2005) found that 26% of the variability in how much students learn from grades 8-12 was associated with students' schools, but student SES accounted for about one-third of that variability, meaning that about 17% of the variability in dropout rates was associated with students' schools (Table 13.2). Student SES explained even more of the variability in dropout rates (Table 13.6), so it is likely that less than 17% of the variability in dropout rates is associated with students' schools. Yet Rumberger (1995) found as much variability in early (grade 8-10) dropout rates among a sample of low-SES middle schools as among a larger, combined sample of low- and high-SES middle schools. Moreover, in the low-SES sample, student background characteristics explained only 5% of the variability. This suggests that school effects may be more important for students attending low-SES schools than schools in general.

[21] Li (2007) estimated that 23% of the variability in dropout rates using HSB data was at the school level and 5% at the state level, with the remaining 72% at the student level. As such, he finds considerable variation in state-level dropout rates.

factors are sometimes considered as "school inputs" by economists and others who study schools, because they refer to the "inputs" into the schooling process that are largely "given" to a school, and therefore not alterable by the school itself (Hanushek, 1986).

Student composition. Student characteristics not only influence student achievement at an individual level, but also at an aggregate or social level. That is, the social composition of students in a school can influence student achievement, apart from the effects of student characteristics at an individual level (Gamoran, 1992). Social composition may affect student achievement in two ways: first, it may simply serve as a proxy for other characteristics of schools, to the extent that those characteristics are correlated with social composition (e.g, high-SES schools have better teachers); or it may impact student achievement directly—through peer effects that influence student achievement through peer learning, peer motivation, or peer social behavior (Kahlenberg, 2001).

We identified a number of studies that examined the relationship between student body composition and high school dropout rates. The studies varied widely in the number and types of measures for student body composition that were examined. Even after controlling for a number of other school characteristics, six studies found several indicators of student composition had direct effects on high school dropout rates: *mean SES* (Rumberger, 1995; Rumberger & Thomas, 2000); the *proportion of at-risk students* (students who get poor grades, cut classes, have discipline problems, or were retained) (Bryk & Thum, 1989; Rumberger, 1995; Rumberger & Thomas, 2000); the *proportion of racial or linguistic minorities* (McNeal, 1997b; Rumberger, 1995; Sander, 2001); *the proportion of students who had changed schools* or residences (Rumberger & Palardy, 2005; Sander, 2001); and *the proportion of students from non-traditional (not both parents) families* (Rumberger & Palardy, 2005). These studies support

the notion that the effects of social composition operate at least partially through peer effects, although some studies have shown that when peer groups (e.g., percentage of disadvantaged students in school) are treated as an endogenous factor—that is, unobserved factors both influence peer group membership and dropout—then peer groups do not exert an independent influence on dropping out (Evans, Oates, & Schwab, 1992; Rivkin, 2001).

The social composition of high schools may have indirect effects on dropout rates through their association with other features of schools that have direct impacts on dropout and graduation rates. One recent study provides a useful illustration. In a statistical model that only controlled for student-level predictors, the study found three measures of school social composition had direct effects on dropout rates: mean SES, the proportion of students whose families had moved between grades 10-12, and the proportion of students from non-traditional families (Rumberger & Palardy, 2005, Table 2). But after controlling for a number of structural, resource, and school practice variables, all the composition variables became insignificant, suggesting that the effects of the composition variables were mediated by other characteristics of the school. Another study also found that mean SES had no direct effects on dropout rates after controlling for a number of other school characteristics, including school size, academic climate, and teacher relations (Lee & Burkam, 2003).

Structure. There is also considerable debate in the research community on the extent to which several structural characteristics contribute to school performance—school location (whether the school is located in an urban, suburban, or rural location), school size, and particularly type of school (public vs. private). It is difficult to draw a causal connection between structural features of schools and student outcomes because the structural features of schools are highly correlated with each other and with other school inputs, mainly student

composition and school resources. For example, in comparison with smaller schools, larger schools are more likely to be: public vs. private, located in an urban vs. suburban or rural community, and have larger vs. smaller concentrations of ethnic and linguistic minorities and poor students (U.S. Department of Education, National Center for Education Statistics, 2003, Indicator 30). Studies also differ in whether they examine the effects of school characteristics on dropping out among individual students or among a sample of schools.[22]

We identified 12 analyses that examined whether dropout rates were higher for students attending urban as opposed to suburban or rural schools. The results were mixed. Several analyses found that attending an urban school increased the odds of dropping out (Levine & Painter, 1999; Marsh, 1991; Rumberger & Larson, 1998; Sander & Krautmann, 1995); two analyses found that dropout rates were actually lower in urban schools (Heck & Mahoe, 2006; Rumberger & Thomas, 2000); and six analyses (in four studies) found no significant effects (Pong & Ju, 2000; Rumberger, 1995; Rumberger & Larson, 1998; Swanson & Schneider, 1999)

We also identified 12 analyses that examined the relationship between high school size and dropout or graduation rates. These results were also mixed. Three analyses found that students were more inclined to drop out of large (1200 in one study; 1500 in another study; single measure of size in another) high schools (Lee & Burkam, 2003; Marsh, 1991; Rumberger & Palardy, 2005), whereas three other analyses found that students were less likely to drop out of large schools (Pirog & Magee, 1997; Rumberger & Thomas, 2000). The remaining analyses found no significant effects (Rumberger, 1995; McNeal, 1997b; Bryk & Thum, 1989; Pirog & Magee, 1997; Pittman & Haughwout, 1987; Grogger, 1997; Sander, 2001; Van Dorn, Bowen, & Blau, 2006), although Rumberger (1995) found that among low-SES middle schools, larger

[22] It is more appropriate to estimate school effects at the school level rather than at the individual student level (see Raudenbush & Bryk, 2002).

schools had higher dropout rates than smaller schools. One reason for the mixed effects is that the relationship between size and student outcomes may be non-linear (Lee & Burkam, 2003), so that measuring school size by a single variable may mask the non-linearity. A related argument is that there are offsetting effects due to size, with large schools offering more curriculum and program offerings, but also a poorer social climate (Pittman & Haughwout, 1987). Moreover, size may have different and conflicting effects on different school outcomes; one recent study found larger schools had greater improvement in student learning, perhaps because of curricular benefits, but they also had higher dropout rates, perhaps because of poorer climate (Rumberger & Palardy, 2005).

One structural feature of schools has generated the most debate is the differences in achievement due to school control; that is, between public and private schools, which include Catholic, other religious, and non-religious schools. Much of the focus of the debate has been on the differences between public and Catholic schools because some scholars have found that Catholic schools produce higher achievement due to their stronger and more egalitarian academic program and their stronger sense of community among students, parents, and teachers (Bryk, Lee, & Holland, 1993; Coleman, Hoffer, & Kilgore, 1982).

We identified 63 analyses that investigated the relationship between school control and dropout or graduation rates (Table 3). The analyses were conducted in different ways—18 compared private schools with public schools and 27 compared Catholic with public (and sometimes other religious or independent) schools. Most of the 35 analyses of middle schools found no significant relationship. At the high school level, a number of analyses found that dropout rates were lower and graduation rates higher in Catholic schools (Evans & Schwab, 1995; Rumberger & Thomas, 2000; Rumberger & Larson, 1998; Sander & Krautmann, 1995;

Sander, 1997; Teachman et al., 1997). Another study found lower dropout rates among Catholic schools after controlling for other inputs, but no significant effects after controlling for school practices (Rumberger & Palardy, 2005). Another study also found no significant effect after controlling for school practices (Lee & Burkam, 2003). Still another study found higher graduation rates for Whites and for Blacks and Hispanics as a group in urban counties, but not in non-urban counties (Neal, 1997). Together these studies support the contention that Catholic high schools improve the odds of graduating (Chubb & Moe, 1990; Coleman & Hoffer, 1987; Coleman & Hoffer, 1987; Rumberger & Thomas, 2000). Yet empirical studies have also found that students from private schools typically transfer to public schools instead of or before dropping out, meaning that student turnover rates in private schools are not statistically different than turnover rates in public schools (Lee & Burkam, 1992; Rumberger & Thomas, 2000).

Resources. Currently, there is considerable debate in the research community about the extent to which school resources contribute to school effectiveness (Hanushek, 1989; Hanushek, 1997; Hedges, Laine, & Greenwald, 1994; Greenwald, Hedges, & Laine, 1996; Hedges et al., 1994). While resources, especially more and better-qualified teachers, should improve educational outcomes, scholars claim that schools lack incentives or the knowledge to use resources effectively (Hanushek & Jorgenson, 1996).

We identified a number of studies that examined the relationship between school resources at the middle and high school levels and dropout or graduation rates. The studies used different indicators for resources, such as average expenditures per pupil, teacher salaries, the number of students per teacher, and measures of teacher quality, such as the percentage of teachers with advanced degrees. Overall, relatively few studies found significant effects. One of two analyses found that higher per pupil spending increased graduation rates, particularly for

students attending rural schools (Roscigno & Crowley, 2001). Two of six analyses (in two studies) found higher mean teacher salaries were associated with lower dropout or higher graduation rates (Pirog & Magee, 1997; Rumberger & Palardy, 2005). Two out of six analyses found that a higher student-teacher ratio was associated with higher dropout rates (Rumberger & Thomas, 2000; McNeal, 1997b). Four analyses found no significant relationship between teacher quality, as measured by the percentage of teachers with advanced degrees, and dropout or graduation rates (Li, 2007; McNeal, 1997b; Pirog & Magee, 1997; Rumberger & Thomas, 2000).

Several additional studies that used district- and state-level data, along with more sophisticated statistical techniques to better control for unobserved factors, found that higher per-pupil expenditures or higher teacher salaries were associated with lower dropout rates (Li, 2007; Loeb & Page, 2000; Warren et al., 2006). For example, Loeb and Page (2000) used a more sophisticated model of teacher salaries that took into account the non-monetary job characteristics and alternative employment opportunities in the local job market, what economists refer to as "opportunity costs". By including those factors in their analysis, they found that that raising teacher wages by 10 percent reduced high school dropout rates by 3-4 percent.

There is strong empirical evidence that one particular school resource in elementary school—small classes—improves high school graduation rates. The study was based on sample of data from Project STAR, a state-wide experiment in Tennessee where students were randomly assigned to a small class (13-17 students), a full-size class (22-26 students), or a full-size class with a full-time teacher aid, for up to four years from grades K through 3 (Finn, Gerber, & Boyd-Zaharias, 2005). The study found that the odds of graduating were 80 percent higher for students

who had spent four years in the small classes compared to students in full-size classes, and the odds were 150 percent higher for low-income students.

Practices. Despite all the attention and controversy surrounding the previous factors associated with school effectiveness, it is the area of school processes that many people believe holds the most promise for understanding and improving school performance. While many schools, especially public ones, have little control over the characteristics of the students they serve, their size and location, and the resources they receive, they do have control over how they are managed, the teaching practices they use, and the climate they create to promote student engagement and learning. In particular, some scholars argue that the social relationships or ties among students, parents, teachers, and administrators—which have been characterized as *social resources* or *social capital*—are a key component of effective and improving schools (Ancess, 2003; Bryk & Schneider, 2002; Elmore, 2004; Hoy, Tarter, & Hoy, 2006).

Current research literature on school dropouts suggests two ways that schools affect student persistence. One way is indirectly, through policies and practices that promote student engagement and prevent students from leaving—either dropping out or transferring—*voluntarily*. The other way is directly, through explicit policies and conscious decisions that cause students to *involuntarily* withdraw from school. These rules may concern factors—such as low grades, poor attendance, misbehavior, or being over-age—that can lead to suspensions, expulsions, or forced transfers of "troublemakers" and other problematic students (Bowditch, 1993; Fine, 1986; Fine, 1991).[23] This form of withdrawal is school-initiated and contrasts with the student-initiated form of voluntary withdrawal. One metaphor that has been used to characterize this process is *discharge*: "students *drop out* of school, schools *discharge* students" (Riehl, 1999, p. 231).

[23] One specific example is the growth of "zero tolerance" (automatic discharge) for violations of school safety rules (Skiba & Peterson, 1999).

We identified a number of studies that examined the relationship between a variety of school practices and dropout or graduation rates. The studies differed in what specific practices were examined and how they were measured. One study, which created a single composite indicator of school climate from student responses to questions about various aspects of the school, such as school loyalty and student behavior (i.e., fighting, cutting class), found that a positive school climate reduced the likelihood of dropping out, net of other factors (Worrell & Hale, 2001). Another study found that schools with higher attendance rates—another measure of overall school climate—had lower dropout rates (Rumberger & Thomas, 2000). Most studies have examined the effects of a number of indicators school academic and disciplinary climate. Several studies found that students were less likely to drop out if they attended schools with a stronger academic climate, as measured by more students in the academic track (versus general or vocational) or taking academic courses, and students reporting more hours of homework (Bryk & Thum, 1989; Lee & Burkam, 2003; Rumberger & Palardy, 2005). Some studies have found that students were more likely to drop out in schools with a poor disciplinary climate, as measured by student reports of student disruptions in class or discipline problems in the school (Bryk & Thum, 1989; Pittman, 1991; Rumberger, 1995; Rumberger & Palardy, 2005). Two studies also found higher dropout rates in schools where students reported feeling unsafe (Lee & Bryk, 1989; Rumberger & Palardy, 2005). Several studies have found that positive relationships between students and teachers—an aspect of school social capital—reduced the risk of dropping out, especially among high-risk students (Croninger & Lee, 2001; Rumberger & Palardy, 2005). One study found that negative student-teacher relationships contributed to higher dropout rates for late—but not early—dropouts, although the effect was rendered insignificant after controlling for students' participation in classroom and in school activities

(Stearns et al., 2007). What is unresolved in this study is the causal connection—whether better student-teacher relationships promote more student engagement or vice-versa. Another study using one of the same data sets (HSB), but using different sets of variables and statistical techniques, found no effect of academic or social climate on high school dropout rates after controlling for the background characteristics of students, social composition, school resources, and school structure (McNeal, 1997b).

We identified only one study that examined the relationship between managerial practices and dropout rates. That study found schools with strong teacher influence over discipline, in-service programs, and curriculum had lower dropout rates; while schools with strong principal leadership over staff and school decisions had higher dropout rates (Rumberger & Palardy, 2005).

In addition to school policies and practices, there are a number of policies that districts and states impose on schools. Three policies are designed either to improve graduation rates directly or to improve the preparation of students who graduate from high school: (1) the compulsory schooling age, (2) course requirements for a high school diploma, and (3) high school exit exams.

States have the authority to determine the age at which students must attend school, which is referred to as the compulsory schooling age. States vary widely in both the minimum and maximum age for attending school. In some states the maximum schooling age—the age at which students no longer have to attend school—is 16 or 17, which means students do not have to stay in school long enough to graduate. One policy recommendation for improving graduation rates is to raise the maximum compulsory schooling age to 18 (Bridgeland, DiIulio, Jr., & Streeter, 2008). Seven analyses in three studies examined the relationship between the state

compulsory schooling age and dropout or graduation rates, with five of the analyses finding that states with higher compulsory schooling ages had lower dropout rates or higher graduation rates (Lillard & DeCicca, 2001; Li, 2007; Warren et al., 2006).

States also have the authority to determine the number and types of courses students must complete in order to earn a diploma; districts and schools can then impose additional requirements. Six analyses in two studies examined the relationship between the number of courses required to earn a diploma and dropout or graduation rates. All four analyses in one study found that more course requirements increased dropout rates (Lillard & DeCicca, 2001), while the two analyses in the other study found no significant relationship (Warren et al., 2006).

One final policy that schools, states, and districts can use to influence dropout rates is the requirement that students pass a test in order to receive a diploma (National Research Council, Committee on Appropriate Test Use, 1999). Such requirements can be set by high schools themselves, but more typically, they are set by school districts and states. Historically, some schools and districts required students to pass a so-called minimum competency exam. More recently, many states have now instituted more rigorous high school exit exams that test students' proficiency in a number of state-mandated, academic standards.

We identified seven studies that examined the relationship between high school exit exams and high school dropout rates. The studies differ in the data and methods they use, as well as the time periods they examine. As a result, the findings of these studies are quite mixed: some found that such requirements increased the likelihood of dropping out (Lillard & DeCicca, 2001; Warren et al., 2006); some found no impact on dropping out (Muller, 1998; Warren & Lee, 2003; Warren & Edwards, 2005); and some found differential effects, one finding that they only increased dropout among better students (Griffin & Heidorn, 1996) and another finding that they

only increased dropout among the lowest ability students (Jacob, 2001). Warrren, Jenkins, and Kulick (2006) appear to resolve some of the inconsistency by showing that several earlier analyses that found no or differential effects (Jacob, 2001; Muller, 1998; Lillard & DeCicca, 2001; Warren & Edwards, 2005) were conducted with data for high school graduates from 1992, whereas more recent data show the high school exit exams since that time have lowered high school completion rates.

Communities

Communities play a crucial role in adolescent development along with families, schools, and peers. Communities influence children and youth through three primary mechanisms: (1) access to *institutional resources* (e.g., child care, medical facilities, employment opportunities), (2) *parental relationships* that can provide access to family and friends as well as social connections with the neighborhood, and (3) *social relationships* (or *social capital*) that arise out of mutual trust and shared values and that can help to supervise and monitor the activities of the residents, particularly youth (Leventhal & Brooks-Gunn, 2000). Some scholars have also argued that neighborhood effects are non-linear—that there is a threshold or tipping point in the quality of neighborhoods that results in particularly high dropout rates in the lowest quality neighborhoods (Crane, 1991).

We identified a number of studies that examined the relationship between community characteristics and dropping out or graduating. The studies differed widely in how they measured community characteristics—most relied on measures of the social composition of the residents in the community, such as the percentage of people holding white-collar jobs, the percentage of people living in poverty, and the percentage of the population with high or low incomes. While a number of studies found that the population characteristics of communities

were associated with dropout rates (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Crane, 1991; Ensminger, Lamkin, & Jacobson, 1996; Neal, 1997; Foster & McLanahan, 1996), the relationship may not be linear—two of the studies found that living in a high-poverty neighborhood was not necessarily detrimental to completing high school, but rather that living in an affluent neighborhood was beneficial to school success (Brooks-Gunn et al., 1993; Ensminger et al., 1996). The latter findings support the notion that affluent neighborhoods provide students more access to community resources and positive role models from affluent neighbors. Some studies found that community characteristics affected some demographic groups, but not others. One study found that Whites, but not Blacks and Hispanics, had higher dropout rates in counties with a higher percentage of families on welfare (Neal, 1997); while another study found that the neighborhood dropout rate affected girls' but not boys' dropout rates (Foster & McLanahan, 1996). Two other studies found that neighborhood violence led to higher dropout rates (Fagan & Pabon, 1990; Grogger, 1997).

Another way that communities can influence dropout rates is by providing employment opportunities both during and after school. Relatively favorable employment opportunities for high school dropouts, as evidenced by low neighborhood unemployment rates, could increase the likelihood that students will drop out. We identified 22 analyses that investigated the relationship between neighborhood unemployment rates and dropout rates, with 18 of them finding no statistically significant relationship (Table 3). Yet two additional studies found that states with higher unemployment rates had lower dropout rates and higher graduation rates (Loeb & Page, 2000; Warren, Jenkins, & Kulick, 2006).

Summary and Conclusions

The longstanding and widespread interest in the issue of high school dropouts has generated a vast research literature, particularly over the last ten years. The purpose of this study was to identify and review this literature. Restricting our focus to research studies published in scholarly journals found in the nation's largest scientific database yielded 203 studies that have been published over the last 25 years, involving 387 separate analyses. To organize our review, we developed a conceptual framework that identified all the key factors that the research has identified as salient to understanding how, when, and why students drop out of high school. These factors had to do with characteristics of individual students—their educational performance, behaviors, attitudes, and backgrounds—as well as the characteristics of the families, schools, and communities where they live and go to school. The review verified that indeed, a number of salient factors within each of these domains are associated with whether students drop out or graduate from high school. Although most of the studies were unable to establish a strong causal connection between the various factors and dropping out, they nonetheless suggest such a connection.

We learned a number of things from this review. The first is that no single factor can completely account for a student's decision to continue in school until graduation. Just as students themselves report a variety of reasons for quitting school, the research literature also identifies a number of salient factors that appear to influence the decision.

Second, the decision to drop out is not simply a result of what happens in school. Clearly, students' behavior and performance in school influence their decision to stay or leave. But students' activities and behaviors outside of school—particularly engaging in deviant and criminal behavior—also influence their likelihood of remaining in school.

Third, dropping out is more of a process than an event. For many students, the process begins in early elementary school. A number of long-term studies that tracked groups of students from preschool or early elementary school through the end of high school were able to identify early indicators that could significantly predict whether students were likely to drop out or finish high school. The two most consistent indicators were early academic performance and students' academic and social behaviors.

Fourth, contexts matter. The research literature has identified a number of factors within families, schools, and communities that affect whether students are likely to drop out or graduate from high school. These include access to not only fiscal and material resources, but also social resources in the form of supportive relationships in families, schools, and communities.

One implication of this review is that there are numerous leverage points for addressing the problem of high dropout rates. Clearly, early intervention in preschool and early elementary school is warranted. Rigorous experimental evaluations have proven that high quality preschool programs and small classes in early elementary school improve high school graduation rates (Barnett & Belfield, 2006; Finn et al., 2005). Such programs are also cost-effective—they generate two to four dollars in economic benefits for every dollar invested (Belfield & Levin, 2007). But there are other leverage points as well. Even high school is not too late—both small programs serving a limited number of high-risk students and comprehensive school reform models have been proven to improve graduation rates (Ibid.).

References

*Indicates studies included in review

*Ahn, N. (1994). Teenage childbearing and high school completion: Accounting for individual heterogeneity. *Family Planning Perspectives*, *26,* 17-21.

*Ahrens, J.A. & Evans, R.G. (1990). Factors related to dropping out of school in an incarcerated population. *Educational and Psychological Measurement*, *50*, 611-617.

*Ainsworth, J.W. & Roscigno, V.J. (2005). Stratification, school-work linkages and vocational education. *Social Forces*, *84*, 257-284.

*Alexander, K.L., Entwisle, D.R., & Horsey, C. (1997). From first grade forward: Early foundations of high school dropout. *Sociology of Education*, *70,* 87-107.

*Alexander, K.L., Entwisle, D.R., & Kabbini, N.S. (2001). The dropout process in life course perspective: Early risk factors at home and school. *Teachers College Record*, *103,* 760-882.

*Alexander, K.L., Entwisle, D.R., & Olson, L.S. (2007). Lasting consequences of the summer learning gap. *American Sociological Review*, *72,* 167-180.

*Allensworth, E.M. (2005). Dropout rates after high-stakes testing in elementary school: A study of the contradictory effects of Chicago's efforts to end social promotion. *Educational Evaluation and Policy Analysis*, *27,* 341-64.

Allensworth, E. & Easton, J.Q. (2005). *The on-track indicator as a predictor of high school graduation*. Chicago: Consortium on Chicago School Research, University of Chicago.

*Alpert, G. & Dunham, R. (1986). Keeping academically marginal youths in school: A prediction model. *Youth & Society*, *17,* 346-361.

Ancess, J. (2003). *Beating the odds: High schools as communities of commitment*. New York: Teachers College Press.

*Anguiano, R.P.V. (2004). Families and schools: The effect of parental involvement on high school completion. *Journal of Family Issues*, *25,* 61-85.

*Aquilino, W.S. (1996). The life course of children born to unmarried mothers: Childhood living arrangements and young adult outcomes. *Journal of Marriage and the Family*, *58,* 293-310.

*Arum, R. (1998). Invested dollars or diverted dreams: The effect of resources on vocational students' educational outcomes. *Sociology of Education, 71,* 130-151.

*Astone, N.M. & McLanahan, S.S. (1991). Family structure, parental practices, and high school completion. *American Sociological Review*, *56,* 309-320.

*Astone, N.M. & McLanahan, S.S. (1994). Family structure, residential mobility, and school dropout: A research note. *Demography*, *31,* 575-584.

*Astone, N.M. & Upchurch, D.M. (1994). Forming a family, leaving school early, and earning a GED: A racial and cohort comparison. *Journal of Marriage and the Family*, *56,* 759-771.

*Balfanz, R., Herzog, L., & Mac Iver, D.J. (2007). Preventing student disengagement and keeping students on the graduation path in urban middle-grades schools: Early identification and effective interventions. *Educational Psychologist, 42,* 223-235.

*Barbaresi, W.J., Katusic, S.K., Colligan, R.C., Weaver, A.L., & Jacobsen, S.J. (2007). Long-term school outcomes for children with attention-deficit/hyperactivity disorder: A population-based perspective. *Journal of Developmental and Behavioral Pediatrics, 28,* 265-273.

*Barnard, W.M. (2004). Parent involvement in elementary school and educational attainment. *Children and Youth Services Review, 26,* 39-62.

Barnett, W.S. & Belfield, C.R. (2006). Early childhood development and social mobility. *The Future of Children, 16,* 73-98.

*Battin-Pearson, S., Newcomb, M.D., Abbott, R.D., Hill, K.G., Catalano, R.F., & Hawkins, J.D. (2000). Predictors of early high school dropout: A test of five theories. *Journal of Educational Psychology, 92,* 568-582.

*Bear, G.G., Kortering, L.J., & Braziel, P. (2006). School completers and noncompleters with learning disabilities: Similarities in academic achievement and perceptions of self and teachers. *Remedial and Special Education, 27,* 293-300.

*Bedard, K. (2001). Human capital versus signaling models: University access and high school dropouts. *Journal of Policy Economy, 109,* 749-775.

*Bedard, K. & Do, C. (2005). Are middle schools more effective?: The impact of school structure on student outcomes. *Journal of Human Resources , 40,* 660-682.

Belfield, C. & Levin, H. M. Eds. (2007). *The price we pay: Economic and social consequences of inadequate education*. Washington, D.C.: Brookings Institution Press.

*Beller, A.H. & Chung, S.S. (1992). Family structure and educational attainment of children: Effects of remarriage. *Journal of Population Economics, 5,* 39-59.

*Benz, M.R., Lindstrom, L., & Yovanoff, P. (2000). Improving graduation and employment outcomes of students with disabilities: Predictive factors and student perspectives. *Exceptional Children, 66,* 509-529.

*Bernburg, J.G. & Krohn, M.D. (2003). Labeling, life chances, and adult crime: The direct and indirect effects of official intervention in adolescence on crime in early adulthood. *Criminology, 41,* 1287-1318.

*Betts, J.R. & Grogger, J. (2003). The impact of grading standards on student achievement, educational attainment, and entry-level earnings. *Economics of Education Review, 22,* 343-352.

*Bickel, R. & Papagiannis, G. (1988). Post-high school prospects and district-level dropout rates. *Youth & Society, 20,* 123-147.

*Bohon, C., Garber, J., & Horowitz, J.L. (2007). Predicting school dropout and adolescent sexual behavior in offspring of depressed and nondepressed mothers. *Journal of the American Academy of Child and Adolescent Psychiatry, 46,* 15-24.

*Boggess, S. (1998). Family structure, economic status, and educational attainment. *Journal of Population Economics*, *11*, 205-222.

Bong, M. & Skaalvik, E.M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review*, *15*, 1-40.

Bowditch, C. (1993). Getting rid of troublemakers: High school disciplinary procedures and the production of dropouts. *Social Problems*, *40*, 493-509.

*Bray, J.W., Zarkin, G.A., Ringwalt, C., & Qi, J.F. (2000). The relationship between marijuana initiation and dropping out of high school. *Health Economics*, *9*, 9-18.

Bridgeland, J. M., DiIulio Jr., J. J., & Morison, K. B. (2006). *The silent epidemic Perspectives on high school dropouts*. Washington, D.C. Civil Enterprises.

Bridgeland, J. M., DiIulio Jr., J. J., & Streeter, R. (2008). *Raising the compulsory school attendance age: The case for reform*. Washington, D.C.: Civic Enterprises.

*Brooks-Gunn, J., Duncan, G.J., Klebanov, P.K., & Sealand, N. (1993). Do neighborhoods influence child and adolescent development? *American Journal of Sociology*, *99*, 353-95.

Bryk, A. S., Lee, V. E., & Holland, P. B. (1993). *Catholic schools and the common good*. Cambridge, MA: Harvard University Press.

Bryk, A. S. & Schneider, B. (2002). *Trust in schools: A core resource for improvement*. New York: Russell Sage.

*Bryk, A.S. & Thum, Y.M. (1989). The effects of high school organization on dropping out: An exploratory investigation. *American Educational Research Journal*, *26*, 353-383.

*Cabrera, A.F. & La Nasa, S.M. (2001). On the path to college: Three critical tasks facing America's disadvantaged. *Research in Higher Education*, *42*, 119-149.

Cahalan, M. W., Ingles, S. J., Burns, L. J., Planty, M., & Daniel, B. (2006). *United States high school sophomores: A twenty-two year comparison, 1980-2002*. (NCES 2006-327) Washington, D.C.: National Center for Education Statistics.

*Cairns, R.B., Cairns, B.D., & Necherman, H.J. (1989). Early school dropout: Configurations and determinants. *Child Development*, *60*, 1437-1452.

*Carbonaro, W.J. (1998). A little help from my friend's parents: Intergenerational closure and educational outcomes. *Sociology of Education*, *71*, 295-313.

*Carr, R., Wright, J.D., & Brody, C.J. (1996). Effects of high school work experience a decade later: Evidence from the National Longitudinal Survey. *Sociology of Education*, *69*, 66-81.

*Chavous, T.M., Bernat, D.H., Schmeelk-Cone, K., Caldwell, C.H., Kohn-Wood, L., & Zimmerman, M.A. (2003). Racial identity and academic attainment among African American adolescents. *Child Development*, *74*, 1076-1090.

Chubb, J. E. & Moe, T. M. (1990). *Politics, markets, and America's schools*. Washington, D.C.: Brookings Institution.

*Clampet-Lundquist, S. (1998). Expanding the neighborhood effects model: Mixing quantitative and qualitative analysis. *Urban Geography*, *19*, 459-476.

*Clements, M.A., Reynolds, A.J., & Hickey, E. (2004). Site-level predictors of children's school and social competence in the Chicago child-parent centers. *Early Childhood Research Quarterly, 19,* 273-296.

Coleman, J.S., Hoffer, T., & Kilgore, S.B. (1982). *High school achievement: Public, Catholic, and private schools compared* . New York: Basic Books.

Coleman, J.S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94,* S95-S120.

Coleman, J.S., Campbell, E.Q., Hobson, C.J., McPartland, J., Mood, A.M., Weinfeld, F.D., & York, R.L. (1966). *Equality of educational opportunity*. Washington, D.C.: U.S. Government Printing Office.

Coleman, J.S. & Hoffer, T. (1987). *Public and private high schools: The impact of communities*. New York: Basic Books.

*Coleman, M. & Deleire, T. (2003). An economic model of locus of control and the human capital investment decision. *Journal of Human Resources, 38,* 701-721.

Conley, R.L. & Chase-Lansdale, S.L. (1998). Adolescent pregnancy and parenthood - Recent evidence and future directions. *American Psychologists, 53,* 152-166.

*Connell, J.P., Halpern-Felsher, B.L., Cliffor, E., Crichlow, W., & Usinger, P. (1995). Hanging in there: Behavioral, psychological, and contextual factors affecting whether African-American adolescents stay in high school. *Journal of Adolescent Research, 10,* 41-63.

*Crane, J. (1991). The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing. *American Journal of Sociology, 96,* 1226-1259 .

*Croninger, R.G. & Lee, V.E. (2001). Social capital and dropping out of high school: Benefits to at-risk students of teachers' support and guidance. *Teachers College Record, 103,* 548-581.

*Crowder, K. & South, S.J. (2003). Neighborhood distress and school dropout: The variable significance of community context. *Social Science Research, 32,* 659-698.

*Crowder, K. & Teachman, J. (2004). Do residential conditions explain the relationship between living arrangements and adolescent behavior? *Journal of Marriage and the Family, 66,* 721-738.

*D'Amico, R. (1984). Does employment during high school impact academic progress? *Sociology of Education, 57,* 152-164.

*Daniel, S.S., Walsh, A.K., Goldston, D.B., Arnold, E.M., Reboussin, B.A., & Wood, F.B. (2006). Suicidality, school dropout, and reading problems among adolescents. *Journal of Learning Disabilities, 39,* 507-514.

*Davis, L.E., Ajzen, I., Saunders, J., & Williams, T. (2002). The decision of African American students to complete high school: An application of the theory of planned behavior. *Journal of Educational Psychology, 94,* 810-819.

Delgado-Gaitan, C. (1988). The value of conformity: Learning to stay in school. *Anthropology and Education Quarterly, 19,* 354-381.

*Driscoll, A.K. (1999). Risk of high school dropout among immigrant and native Hispanic youth. *International Migration Review, 33,* 857-875.

*Dunham, R. & Wilson, G. (2007). Race, within-family social capital, and school dropout: An analysis of Whites, Blacks, Hispanics, and Asians. *Sociological Spectrum, 27,* 207-221.

*Dunn, C., Chambers, D., & Rabren, K. (2004). Variables affecting students' decisions to drop out of school. *Remedial and Special Education, 25,* 314-323.

Eccles, J.S. & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Pyschology, 53,* 109-132.

*Eckstein, Z. & Wolpin, K.I. (1999). Why youths drop out of high school: The impact of preferences, opportunities, and abilities. *Econometrica, 67,* 1295-1339.

*Eide, E.R. & Showalter, M.H. (2001). The effect of grade retention on educational and labor market outcomes. *Economics of Education Review, 20,* 563-576.

*Ekstrom, R.B., Goertz, M.E., Pollack, J.M., & Rock, D.A. (1986). Who drops out of high school and why?: Findings from a national study. *Teachers College Record, 87,* 356-373.

*Ellickson, P., Bui, K., Bell, R., & Mcguigan, K. A. (1998). Does early drug use increase the risk of dropping out of high school? *Journal of Drug Issues, 28 (2),* 357-380.

Elmore, R. F. (2004). *School reform from the inside out*. Cambridge, MA: Harvard Education Press.

*Ensminger, M.E., Lamkin, R.P., & Jacobson, N. (1996). School leaving: A longitudinal perspective including neighborhood effects. *Child Development, 67,* 2400-2416.

*Ensminger, M.E., Hanson, S.G., Riley, A.W., & Juon, H.-S. (2003). Maternal psychological distress: Adult sons' and daughters' mental health and educational attainment. *Journal of the American Academy of Child and Adolescent Psychiatry, 42,* 1108-1115.

*Ensminger, M.E. & Slusacick, A.L. (1992). Paths to high school graduation or dropout: A longitudinal study of a first-grade cohort. *Sociology of Education, 65,* 95-113.

*Entwisle, D.R., Alexander, K.L., & Olson, L.S. (2004). Temporary as compared to permanent high school dropout. *Social Forces, 82,* 1181-1205.

*Entwisle, D.R., Alexander, K.L., & Olson, L.S. (2005). Urban teenagers: Work and dropout. *Youth & Society, 37,* 3-32.

*Entwisle, D.R., Alexander, K.L., & Olson, L.S. (2005). First grade and educational attainment by age 22: A new story. *American Journal of Sociology, 110,* 1458-1502.

Evans, G.W. (2004). The environment of childhood poverty. *American Psychologist, 59,* 77-92.

*Evans, W.N., Oates, W.E., & Schwab, R.M. (1992). Measuring peer group effects: A study of teenage behavior. *The Journal of Political Economy, 100,* 966-991.

*Evans, W.N. & Schwab, R.M. (1995). Finishing high school and starting college: Do Catholic schools make a difference? *The Quarterly Journal of Economics, 110,* 941-974.

*Fagan, J. & Pabon, E. (1990). Contributions of delinquency and substance use to school dropout among inner-city youths. *Youth & Society, 21,* 306-354.

Fan, X. & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13,* 1-22.

*Farahati, F., Marcotte, D.E., & Wilcox-Gok, V. (2003). The effects of parents' psychiatric disorders on children's high school dropout. *Economics of Education Review, 22,* 167-178.

*Farmer, T.W., Estell, D.B., Leung, M.C., Trott, H., Bishop, J., & Cairns, B.D. (2003). Individual characteristics, early adolescent peer affiliations, and school dropout: an examination of aggressive and popular group types. *Journal of School Psychology, 41,* 217-232.

*Fernandez, R.M., Paulsen, R., & Hirano-Nakanishi, M. (1989). Dropping out among Hispanic youth. *Social Science Research, 18,* 21-52.

Fine, M. (1986). Why urban adolescents drop into and out of public high school. *Teachers College Record, 87,* 393-409.

Fine, M. (1991). *Framing dropouts: Notes on the politics of an urban public high school*. Albany, NY: State University of New York Press.

Finn, J.D. (1989). Withdrawing from school. *Review of Educational Research, 59,* 117-142.

*Finn, J.D., Gerber, S.B., & Boyd-Zaharias, J. (2005). Small classes in the early grades, academic achievement, and graduating from high school. *Journal of Educational Psychology, 97,* 214-223.

*Finn, J.D. & Rock, D.A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology, 82,* 221-234.

*Fischer, M.J. & Kmec, J.A. (2004). Neighborhood socioeconomic conditions as moderators of family resource transmission: High school completion among at-risk youth. *Sociological Perspectives, 47,* 507-527.

*Fitzpatrick, K.M. & Yoels, W.C. (1992). Policy, school structure, and sociodemographic effects on statewide high school dropout rates. *Sociology of Education, 65,* 76-93.

Flores-Gonzalez, N. (2002). *School kids/street kids: Identity development in Latino students*. New York: Teachers College Press.

*Forste, R. & Tienda, M. (1992). Race and ethnic variation in the schooling consequences of female adolescent sexual-activity. *Social Science Quarterly, 73,* 12-30.

*Foster, E.M. & McLanahan, S. (1996). An illustration of the use of instrumental variables: Do neighborhood conditions affect a young person's chance of finishing high school? *Psychological Methods, 1,* 249-260.

Fredricks, J.A., Blumenfeld, P.C., & Paris, A.H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74,* 59-109.

*French, D. & Conrad, J. (2001). School dropout as predicted by peer rejection and antisocial behavior. *Journal of Research on Adolescence, 11,* 225-244.

Gamoran, A. (1987). The stratification of high school learning opportunities. *Sociology of Education, 60,* 135-155.

Gamoran, A. (1992). Social factors in education. In M. C. Alkin (Ed.), *Encyclopedia of Educational Research* (pp.1222-1229). New York: Macmillan.

*Garasky, S. (1995). The effects of family-structure on educational attainment: Do the effects vary by the age of the child? *American Journal of Economics and Sociology*, *54,* 89-105.

*Garnier, H.E., Stein, J.A., & Jacobs, J.K. (1997). The process of dropping out of high school: A 19-year perspective. *American Educational Research Journal*, *34,* 395-419.

Gibson, M.A. (1997). Complicating the immigrant/involuntary minority typology. *Anthropology & Education Quarterly*, *28,* 431-454.

*Ginther, D.K. & Pollak, R.A. (2004). Family structure and children's educational outcomes: Blended families, stylized facts, and descriptive regressions. *Demography, 41,* 671-696.

*Goldschmidt, P. & Wang, J. (1999). When can schools affect dropout behavior? A longitudinal multilevel analysis. *American Educational Research Journal*, *36,* 715-738.

Gorey, K.M. (2001). Early childhood education: A meta-analytic affirmation of the short- and long-term benefits of educational opportunity. *School Psychology Quarterly*, *16,* 9-30.

Greenberger, E. & Steinberg, L. (1986). *When teenagers work: The psychological and social costs of adolescent employment*. New York: Basic Books.

Greenwald, R., Hedges, L.V., & Laine, R.D. (1996). The effect of school resources on student achievement. *Review of Educational Research*, *66,* 361-396.

*Griffin, B.W. & Heidorn, M.H. (1996). An examination of the relationship between minimum competency test performance and dropping out of high school. *Educational Evaluation and Policy Analysis*, *18,* 243-252.

*Grogger, J. (1997). Local violence and educational attainment. *The Journal of Human Resources*, *32,* 659-682.

*Grogger, J. & Bronars, S. (1993). The socioeconomic consequences of teenage childbearing: Findings from a natural experiment. *Family Planning Perspectives*, *25,* 156-&.

Grubb, W.N. & Lazerson, M. (2005). The education gospel and the role of vocationalism in American education. *American Journal of Education*, *111*, 297-319.

*Hagan, J., & Foster, H. (2001). Youth violence and the end of adolescence. *American Sociological Review*, *66*(6), 874-899.

Hammond, C., Linton, D., Smink, J., & Dew, S. (2007). *Dropout risk factors and exemplary programs: A technical report*. Clemson, SC: National Dropout Prevention Center/Network, Clemson University and Communities in Schools.

*Hannon, L. (2003). Poverty, delinquency, and educational attainment: Cumulative disadvantage or disadvantage saturation? *Sociological Inquiry*, *73,* 575-594.

Hanushek, E.A. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature*, *24,* 1141-1177.

Hanushek, E.A. (1989). The impact of differential expenditures on school performance. *Educational Researcher*, *18,* 45-62.

Hanushek, E.A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis*, *19,* 141-164.

Hanushek, E. A. & Jorgenson, D. W.(Eds.) (1996). *Improving America's schools: The role of incentives*. Washington, D.C.: National Academy Press.

*Harding, D.J. (2003). Counterfactual models of neighborhood effects: The effect of neighborhood poverty on dropping out and teenage pregnancy. *American Journal of Sociology*, *109,* 676-719.

*Haurin, R.J. (1992). Patterns of childhood residence and the relationship to young-adult outcomes. *Journal of Marriage and the Family*, *54,* 846-860.

*Haveman, R., Wolfe, B., & Spaulding, J. (1991). Childhood events and circumstances influencing high school completion. *Demography*, *28,* 133-157.

*Heck, R. H., & Mahoe, R. (2006). Student transition to high School and persistence: Highlighting the influences of social divisions and school contingencies. *American Journal of Education, 112 (3),* 418-446.

Hedges, L.V., Laine, R.D., & Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher*, *23,* 5-14.

*Hess, R.S. & Copeland, E.P. (2001). Students' stress, coping strategies, and school completion: A longitudinal perspective. *School Psychology Quarterly*, *16,* 389-405.

*Hill, L.E. & Jepsen, C. (2007). Positive outcomes from poor starts: Predictors of dropping back in. *Economics of Education Review*, *26,* 588-603.

*Hoffer, T.B. (1997). High school graduation requirements: Effects on dropping out and student achievement. *Teachers College Record*, *98,* 584-607.

*Hofferth, S.L., Boisjoly, J., & Duncan, G.J. (1998). Parents' extrafamilial resources and children's school attainment. *Sociology of Education*, *71,* 246-268.

*Hofferth, S.L., Reid, L., & Mott, F.L. (2001). The effects of early childbearing on schooling over time. *Family Planning Perspectives*, *33,* 259-267.

*Hoffman, S.D., Foster, E.M., & Furstenberg, F.F. (1993). Reevaluating the costs of teenage childbearing. *Demography*, *30,* 1-13.

Hoover-Dempsey, K.V. & Sandler, H.M. (1997). Why do parents become involved in their children's education? *Review of Educational Research, 67,* 3-42.

*Hotz, V.J., McElroy, S.W., & Sanders, S.G. (2005). Teenage childbearing and its life cycle consequences: Exploiting a natural experiment. *Journal of Human Resources*, *40,* 683-715.

*Hotz, V.J., Mullin, C.H., & Sanders, S.G. (1997). Bounding causal effects using data from a contaminated natural experiment: Analyzing the effects of teenage childbearing. *Review of Economic Studies*, *64,* 575-603.

Hoy, W.K., Tarter, C.J., & Hoy, A.W. (2006). Academic optimism of schools: A force for student achievement. *American Educational Research Journal*, *43,* 425-446.

Humke, C. & Schaeffer, C. (1995). Relocation: A review of the effects of residential-mobility on children and adolescents. *Psychology, 32,* 16-24.

Ingels, S. J., Scott, L. A., Lindmark, J. T., Frankel, M. R., & Myers, S. L. (1992). *National Education Longitudinal Study of 1988, First follow-up: Student component data file user's manual*. Washington, D.C.: U.S. Department of Education.

*Jacob, B.A. (2001). Getting tough? The impact of high school graduation exams. *Educational Evaluation and Policy Analysis, 23,* 99-121.

Jencks, C., Smith, M., Acland, H., Bane, M. J., Cohen, D., Gintis, H., Heyns, B., & Michelson, S. M. (1972). *Inequality: A reassessment of the effects of family and schooling in America*. New York: Basic Books.

Jessor, R. (1993). Successful adolescent development among youth in high-risk settings. *American Psychologist, 48,* 117-126.

Jeynes, W.H. (2007). The relationship between parental involvement and urban secondary school student academic achievement - A meta-analysis. *Urban Education, 42,* 82-110.

*Jimerson, S.R. (1999). On the failure of failure: Examining the association between early grade retention and education and employment outcomes during late adolescence. *Journal of School Psychology, 37,* 243-272.

Jimerson, S.R., Anderson, G.E., & Whipple, A.D. (2002). Winning the battle and losing the war: Examining the relation between grade retention and dropping out of high school. *Psychology in the Schools, 39,* 441-457.

*Jimerson, S., Egeland, B., Sroufe, L.A., & Carlson, B. (2000). A prospective longitudinal study of high school dropouts: Examining multiple predictors across development. *Journal of School Psychology, 38,* 525-549.

Kahlenberg, R. D. (2001). *All together now: Creating middle-class schools through public school choice*. Washington, D.C.: Brookings Institution.

Kao, G. & Tienda, M. (1995). Optimism and achievement: The educational performance of immigrant youth. *Social Science Quarterly, 76,* 1-19.

*Kaplan, D.S., Peck, B.M., & Kaplan, H.B. (1997). Decomposing the academic failure-dropout relationship: A longitudinal analysis. *Journal of Educational Research, 90,* 331-343.

*Kaplan, H. B., & Liu, X. R. (1994). A longitudinal analysis of mediating variables in the drug-use dropping-out relationship. *Criminology, 32 (3),* 415-439.

Kaufman, P. & Bradby, D. (1992). *Characteristics of at-risk students in the NELS:88*. Washington, D.C.: U.S. Government Printing Office.

*Kasen, S., Cohen, P., & Brook J.S. (1998). Adolescent school experiences and dropout, adolescent pregnancy, and young adult deviant behavior. *Journal of Adolescent Research, 13,* 49-72.

*Koball, H. (2007). Living arrangements and school dropout among minor mothers following welfare reform. *Social Science Quarterly, 88,* 1374-1391.

*Koch, S.F. & Mcgeary, K.A. (2005). The effect of youth alcohol initiation on high school completion. *Economic Inquiry, 43,* 750-765.

*Kortering, L., Haring, N., & Klockars, A. (1992). The identification of high-school dropouts identified as learning disabled: Evaluating the utility of a discriminant analysis function. *Exceptional Children, 58,* 422-435.

*Koshal, R., Koshal, M., & Marino, B. (1995). High-school dropouts: A case of negatively sloping supply and positively sloping demand curves. *Applied Economics, 27,* 751-757.

*Krohn, M.D., Lizotte, A.J., & Perez, C.M. (1997). The interrelationship between substance use and precocious transitions to adult statuses. *Journal of Health and Social Behavior, 38,* 87-103.

Kurlaender, M., Reardon, S., & Jackson, J. (2008). *Middle school predictors of high school achievement in three California school districts*. Santa Barbara, CA: California Dropout Research Project.

Laird, J., Kienzi, G., DeBell, M., & Chapman, C. (2007). *Dropout rates in the United States: 2005*. Washington, D.C.: U.S. Department of Education, National Center for Education Statistics. Retrieved October 7, 2008, from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007059

*Lee, J.C. & Staff, J. (2007). When work matters: The varying impact of work intensity on high school dropout. *Sociology of Education, 80,* 158-178.

Lee, V.E. (2000). Using hierarchical linear modeling to study social contexts: The case of school effects. *Educational Psychologist, 35,* 125-141.

Lee, V.E. & Bryk, A.S. (1989). A multilevel model of the social distribution of high school achievement. *Sociology of Education, 62,* 172-192.

*Lee, V.E. & Burkam, D.T. (1992). Transferring high schools: An alternative to dropping out? *American Journal of Education, 100,* 420-453.

*Lee, V.E. & Burkam, D.T. (2003). Dropping out of high school: The role of school organization and structure. *American Educational Research Journal, 40,* 353-393.

*Levenstein, P., Levenstein, S., Shiminski, J.A., & Stolzberg, J.E. (1998). At-risk toddlers: An exploratory study of high school outcomes in the replication of the mother-child home program. *Journal of Applied Developmental Psychology, 19,* 267-285.

Leventhal, T. & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin, 126,* 309-337.

*Levine, D. I., & Painter, G. (1999). The NELS Curve: Replicating the bell curve analyses with the National Education Longitudinal Study. *Industrial Relations, 38 (3),* 364-406.

*Levine, D.I. & Painter, G. (2003). The schooling costs of teenage out-of-wedlock childbearing: Analysis with a within-school propensity-score-matching estimator. *Review of Economics and Statistics, 85,* 884-900.

*Li, M. (2007). Bayesian proportional hazard analysis of the timing of high school dropout decisions. *Econometric Reviews, 26,* 529-556.

*Lichter, D.T., Cornwell, G.T., & Eggebeen, D.J. (1993). Harvesting human-capital: Family structure and education among rural youth. *Rural Sociology, 58,* 53-75.

*Lillard, D.R. & DeCicca, P.P. (2001). Higher standards, more dropouts? Evidence within and across time. *Economics of Education Review, 20,* 459-473.

*Loeb, S. & Page, M.E. (2000). Examining the link between teacher wages and student outcomes: The importance of alternative labor market opportunities and non-pecuniary variation. *The Review of Economics and Statistics, 82,* 393-408.

Lucas, S. R. (1999). *Tracking inequality: Stratification and mobility in American high schools*. New York: Teachers College Press .

*Lutz, A. (2007). Barriers to high school completion among immigrant and later-generation Latinos in the USA: Language, ethnicity and socioeconomic status. *Ethnicities, 7,* 323-342.

*Manski, C.F., Sandefur, G.D., Mclanahan, S., & Powers, D. (1992). Alternative estimates of the effect of family-structure during adolescence on high-school graduation. *Journal of the American Statistical Association, 87,* 25-37.

*Marsh, H.W. (1991). Employment during high school: Character building or a subversion of academic goals? *Sociology of Education, 64,* 172-189.

Marsh, H.W. & Kleitman, S. (2005). Consequences of employment during high school: Character building, subversion of academic goals, or a threshold? *American Educational Research Journal, 42,* 331-369.

*Mccluskey, C.P., Krohn, M.D., Lizotte, A.J., & Rodriguez, M.L. (2002). Early substance use and school achievement: An examination of Latino, White, and African American youth. *Journal of Drug Issues, 32,* 921-943.

*McElroy, S.W. (1996). Early childbearing, high school completion, and college enrollment: Evidence from 1980 High School Sophomores. *Economics of Education Review, 15,* 303-324.

*McNeal, R.B. (1995). Extracurricular activities and high school dropouts. *Sociology of Education, 68,* 62-80.

*McNeal, R.B. (1997). Are students being pulled out of high school? The effect of adolescent employment on dropping out. *Sociology of Education, 70,* 206-220.

*McNeal, R.B. (1997). High school dropouts: A closer examination of school effects. *Social Science Quarterly, 78,* 209-222.

*Melnick, M.J., Saba, D.F., & Vonfossen, B. (1992). Educational effects of interscholastic athletic participation on African-American and Hispanic youth. *Adolescence, 27,* 295-308.

*Menning, C.L. (2006). Nonresident fathering and school failure. *Journal of Family Issues, 27,* 1356-1382.

*Mensch, B.S. & Kandel, D.B. (1988). Dropping out of high school and drug involvement. *Sociology of Education, 61,* 95-113.

*Morris, J.D., Ehren, B.J., & Lenz, B.K. (1991). Building a model to predict which fourth through eighth graders will drop out of high school. *Journal of Experimental Education, 59,* 286-293.

*Muller, C. (1998). The minimum competency exam requirement, teachers' and students' expectations and academic performance. *Social Psychology of Education, 2,* 199-216.

National Research Council, Committee on Appropriate Test Use (1999). *High stakes: Testing for tracking, promotion, and graduation*. Jay P. Heubert and Robert M. Hauser, editors. Washington, D.C.: National Academy Press.

National Research Council, Committee on Increasing High School Students' Engagement and Motivation to Learn (2004). *Engaging schools: Fostering high school students' motivation to learn*. Washington, D.C.: The National Academies Press.

National Research Council, Panel on High-Risk Youth (1993). *Losing generations: Adolescents in high-risk settings*. Washington, D.C.: National Academies Press.

*Neal, D. (1997). The effects of Catholic secondary schooling on educational achievement. *Journal of Labor Economics, 15,* 98-123.

*Newcomb, M.D., Abbott, R.D., Catalano, R.F., Hawkins, J.D., Battin-Pearson, S., & Hill, K. (2002). Mediational and deviance theories of late high school failure: Process roles of structural strains, academic competence, and general versus specific problem behaviors. *Journal of Counseling Psychology, 49,* 172-186.

Newmann, F. M.(Ed.) Editor. (1992). *Student engagement and achievement in American secondary schools*. New York: Teachers College Press.

Oakes, J. (1986). *Keeping track: How schools structure inequality*. New Haven: Yale University Press.

*Oettinger, G.S. (2000). Sibling similarity in high school graduation outcomes: Causal interdependency or unobserved heterogeneity? *Southern Economic Journal, 66,* 631-648.

*Olantunji, A.N. (2005). Dropping out of high school among Mexican-origin youths: Is early work experience a factor? *Harvard Educational Review, 75,* 286-305.

Orfield, G. & Lee, C. (2005). *Why segregation matters: Poverty and educational inequality*. Cambridge, MA: The Civil Rights Project, Harvard University.

*Orthner, D.K. & Randolph, K.A. (1999). Welfare reform and high school dropout patterns for children. *Children and Youth Services Review, 21,* 881-900.

*Ou, S.R. (2005). Pathways of long-term effects of an early intervention program on educational attainment: Findings from the Chicago longitudinal study. *Journal of Applied Developmental Psychology, 26,* 578-611.

*Ou, S.R., Mersky, J.P., Reynolds, A.J., & Kohler, K.M. (2007). Alterable predictors of educational attainment, income, and crime: Findings from an inner-city cohort. *Social Service Review, 81,* 85-128.

*Perreira, K.M., Harris, K.M., & Lee, D. (2006). Making it in America: High school completion by immigrant and native youth. *Demography, 43,* 511-536.

*Pirog, M.A. & Magee, C. (1997). High school completion: The influence of schools, families, and adolescent parenting. *Social science quarterly , 78,* 710-724.

*Pittman, R.B. (1991). Social factors, enrollment in vocational/technical courses, and high school dropout rates. *Journal of Educational Research, 84,* 288-295.

*Pittman, R.B. & Haughwout, P. (1987). Influence of high school size on dropout rate. *Educational Evaluation and Policy Analysis*, *9,* 337-343.

Planty, M., Provasnik, S., & Daniel, B. (2007). *High school coursetaking: Findings from the Condition of Education 2007*. (NCES 2007-065) Washington, D.C.: National Center for Education Statistics.

Pomerantz, E.M., Moorman, E.A., & Litwack, S.D. (2007). The how, whom, and why of parents' involvement in children's academic lives: More is not always better. *Review of Educational Research*, *77,* 373-410.

*Pong, S.-L. & Ju, D.B. (2000). The effects of change in family structure and income on dropping out of middle and high school. *Journal of Family Issues*, *21,* 147-169.

*Powell, B., & Steelman, L.C. (1993). The educational benefits of being spaced out: Sibship density and educational progress. *American Sociological Review, 58 (3),* 367-381.

*Powers, R.S. & Wojtkiewicz, R.A. (2004). Occupational aspirations, gender, and educational attainment. *Sociological Spectrum*, *24,* 601-622.

Pribesh, S. & Downey, D.B. (1999). Why are residential and school moves associated with poor school performance? *Demography*, *36,* 521-534.

*Randolph, K.A., Fraser, M.W., & Orthner, D.K. (2004). Educational resilience among youth at risk. *Substance Use & Misuse*, *39,* 747-767.

*Randolph, K.A., Fraser, M.W., & Orthner, D.K. (2006). A strategy for assessing the impact of time-varying family risk factors on high school dropout. *Journal of Family Issues, 27,* 933-950.

Raudenbush, S.W. & Willms, J.D. (1995). The estimation of school effects. *Journal of Educational and Behavioral Statistics*, *20,* 307-335.

Ream, R.K. (2005). Toward understanding how social capital mediates the impact of mobility on Mexican American achievement. *Social Forces*, *84,* 201-224.

Ream, R. K. (2005). *Uprooting children: Mobility, social capital, and Mexican American underachievement*. New York: LFB Scholarly Publishing.

Ream, R.K. & Rumberger, R.W. (2008). Student engagement, peer social capital, and school dropout among Mexican American and non-Latino white students. *Sociology of Education*, *81,* 109-139.

*Rees, D.I. & Mocan, H.N. (1997). Labor market conditions and the high school dropout rate: Evidence from New York State. *Economics of Education Review*, *16,* 103-109.

*Renna, F. (2007). The economic cost of teen drinking: Late graduation and lowered earnings. *Health Economics*, *16,* 407-419.

*Reschly, A.L. & Christenson, S.L. (2006). Prediction of dropout among students with mild disabilities: A case for the inclusion of student engagement variables. *Remedial and Special Education*, *27,* 276-292.

*Reyes, O. (1993). Follow-up study on low-risk and high-risk Hispanic high school students. *Journal of Community Psychology*, *21*, 218-226.

*Reynolds, A.J., On, S.R., & Topitzes, J.W. (2004). Paths of effects of early childhood intervention on educational attainment and delinquency: A confirmatory analysis of the Chicago child-parent centers. *Child Development, 75,* 1299-1328.

*Reynolds, A.J., Temple, J.A., Robertson, D.L., & Mann, E.A. (2001). Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income children in public schools. *Journal of the American Medical Association (JAMA), 285,* 2339-2346.

*Ribar, D.C. (1994). Teenage fertility and high school completion. *Review of Economics and Statistics , 76,* 413-424.

*Ripple, C.H. & Luthar, S.S. (2000). Academic risk among inner-city adolescents: The role of personal attributes. *Journal of School Psychology, 38,* 277-298.

*Rivkin, S.G. (2001). Tiebout sorting, aggregation and the estimation of peer group effects. *Economics of Education Review, 20,* 201-209.

*Roderick, M. (1994). Grade retention and school dropout: Investigating the association. *American Educational Research Journal, 31,* 729-759.

*Roebuck, M.C., French, M.T., & Dennis, M.L. (2004). Adolescent marijuana use and school attendance. *Economics of Education Review, 23,* 133-141.

Romo, H. D. & Falbo, T. (1996). *Latino high school graduation: Defying the odds*. Austin: University of Texas Press.

*Roscigno, V.J. & Crowley, M.L. (2001). Rurality, institutional disadvantage, and achievement/attainment. *Rural Sociology, 66,* 268-293.

Rotermund, S. (2007). *Why students drop out of high school: Comparisons from three national surveys* . Santa Barbara: California Dropout Research Project, University of California, Santa Barbara. Retrieved October 7, 2008, from http://lmri.ucsb.edu/dropouts/pubs.htm

*Rumberger, R.W. (1983). Dropping out of high school: The influence of race, sex, and family background. *American Educational Research Journal, 20,* 199-220.

Rumberger, R.W. (1987). High school dropouts: A review of issues and evidence. *Review of Educational Research, 57,* 101-121.

*Rumberger, R.W. (1995). Dropping out of middle school: A multilevel analysis of students and schools. *American Educational Research Journal, 32,* 583-625.

Rumberger, R.W. (2003). The causes and consequences of student mobility. *Journal of Negro Education, 72,* 6-21.

Rumberger, R. W. (2004). Why students drop out of school. In Gary Orfield (Ed.), *Dropouts in America: Confronting the graduation rate crisis* (pp.131-155). Cambridge, MA: Harvard Education Press.

Rumberger, R. W. & Gándara, P. (2008). Resource needs for educating linguistic minority students. In Helen F. Ladd and Edward B. Fiske (Eds.), *Handbook of Research in Education Finance and Governance* (pp.591-611). New York: Routledge.

*Rumberger, R.W. & Larson, K.A. (1998). Student mobility and the increased risk of high school drop out. *American Journal of Education, 107,* 1-35.

Rumberger, R. W. & Palardy, G. J. (2004). Multilevel models for school effectiveness research. In D. Kaplan (Ed.), *Handbook of Quantitative Methodology for the Social Sciences* (pp.235-258). Thousand Oaks, CA: Sage Publications.

*Rumberger, R.W. & Palardy, G.J. (2005). Test scores, dropout rates, and transfer rates as alternative indicators of high school performance. *American Educational Research Journal, 41,* 3-42.

*Rumberger, R.W. & Thomas, S.L. (2000). The distribution of dropout and turnover rates among urban and suburban high schools. *Sociology of Education, 73,* 39-67.

*Rylance, B.J. (1997). Predictors of high school graduation or dropping out for youths with severe emotional disturbances. *Behavioral Disorders, 23,* 5-17.

Saiz, A. & Zoido, E. (2005). Listening to what the world says: Bilingualism and earnings in the United States. *Review of Economics and Statistics, 87,* 523-538.

*Sandefur, G.D., Mclanahan, S., & Wojtkiewicz, R.A. (1992). The effects of parental marital status during adolescence on high school graduation. *Social Forces, 71,* 103-121.

*Sander, W. (1997). Catholic high schools and rural academic achievement. *American Journal of Agricultural Economics, 79,* 1-12.

*Sander, W. (2001). Chicago public schools and student achievement. *Urban Education, 36 (1),* 27-38.

*Sander, W. & Krautmann, A.C. (1995). Catholic schools, dropout rates and educational attainment. *Economic Inquiry, 33,* 217-233.

Schneider, B., Carnoy, Martin, Kilpatrick, Schmidt, W. H., & Shavelson, R. J. (2007). *Estimating causal effects using experimental and observations designs*. Report from the Governing Board of the American Educational Research Association Grants Program. Washington, D.C.: American Educational Research Association.

Seltzer, J.A. (1994). Consequences of marital dissolution for children. *Annual Review of Sociology, 20,* 235-266.

Shanahan, M.J. & Flaherty, B.P. (2001). Dynamic patterns of time use in adolescence. *Child Development, 72,* 385-401.

Shin, H. B. (2005). *School enrollment--Social and economic characteristics of students: October 2003*. P20-554 Washington, D.C.: US Census Bureau.

Silver, D., Saunders, M., & Zarate, E. (2008). *What factors predict high school graduation in the Los Angeles Unified School District?* Santa Barbara: California Dropout Research Project, University of California, Santa Barbara.

*Smokowski, P.R., Mann, E.A., Reynolds, A.J., & Fraser, M.W. (2004). Childhood risk and protective factors and late adolescent adjustment in inner city minority youth. *Children and Youth Services Review, 26,* 63-91.

*South, S.J., Baumer, E.P., & Lutz, A. (2003). Interpreting community effects on youth educational attainment. *Youth and Society, 35,* 3-36.

*South, S.J., Haynie, D.L., & Bose, S. (2007). Student mobility and school dropout. *Social Science Research, 36,* 68-94.

Spera, C. (2005). A review of the relationship among parenting practices, parenting styles, and adolescent school achievement. *Educational Psychological Review, 17,* 120-146.

Stanton-Salazar, R.D. (1997). A social capital framework for understanding the socialization of racial minority children and youths. *Harvard Educational Review, 67,* 1-40.

*Stearns, E., Moller, S., Blau, J., & Potochnick, S. (2007). Staying back and dropping out: The relationship between grade retention and school dropout. *Sociology of Education, 80,* 210-240.

Steinberg, L., Blinde, P.L., & Chan, K.S. (1984). Dropping out among language minority youth. *Review of Educational Research, 54,* 113-132.

*Stevenson, W., Maton, K. I., & Teti, D. M. (1998). School importance and dropout among pregnant adolescents. *Journal of Adolescent Health, 22 (5),* 376-382.

*Stone, S. (2006). Correlates of change in student reported parent involvement in schooling: A new look at the National Education Longitudinal Study of 1988. *American Journal of Orthopsychiatry, 76,* 518-530.

*Suh, S., Suh, J., & Houston, I. (2007). Predictors of categorical at-risk high school dropouts. *Journal of Counseling and Development, 85,* 196-203.

*Swanson, C.B. & Schneider, B. (1999). Students on the move: Residential and educational mobility in America's schools. *Sociology of Education, 72,* 54-67.

*Sweeten, G. (2006). Who will graduate? Disruption of high school education by arrest and court involvement. *Justice Quarterly, 23,* 462-480.

*Tanner, J., Davies, S., & O'Grady, B. (1999). Whatever happened to yesterday's rebels? Longitudinal effects of youth delinquency on education and employment. *Social Problems, 46,* 250-274.

*Teachman, J.D., Paasch, K., & Carver, K. (1996). School capital and dropping out of school. *Journal of Marriage and the Family, 58,* 773-783.

*Teachman, J. D., Paasch, K., & Carver, K. (1997). Social capital and the generation of human capital. *Social Forces, 75 (4),* 1343-1359.

*Temple, J.A., Reynolds, A.J., & Miedel, W.T. (2000). Can early intervention prevent high school dropout? Evidence from the Chicago child-parent centers. *Urban Education, 35,* 31-56.

Texas Education Agency (2007). *Grade level retention in Texas public schools, 2005-06*. Austin: Texas Education Agency.

Tidwell, R. (1988). Dropouts speak out: Qualitative data on early school departures. *Adolescence, 23,* 939-954.

U.S. Bureau of the Census (2007). *Geographic mobility: 2005 to 2006*. Washington, D.C.: Retrieved August 30, 2008, from: http://www.census.gov/population/www/socdemo/migrate/cps2006.html.

U.S. Census Bureau (2005). *School enrollment--Social and economic characteristics of students: October 2003*. Series P-20, No. 554 Washington, D.C.: U.S. Government Printing Office.

U.S. Census Bureau (2007). *America's families and living arrangements 2007*. Washington, D.C.: U.S. Census Bureau.

U.S. Department of Education, National Center for Education Statistics (2003). *The condition of education, 2003*. NCES 2003--67. Washington, D.C.: U.S. Government Printing Office.

*Upchurch, D. & McCarthy, J. (1990). The timing of a first birth and high school completion. *American Sociological Review, 55,* 224-234.

Valenzuela, A. (1999). *Subtractive schooling: U.S.-Mexican youth and the politics of caring*. Albany: State University of New York Press.

*Van Dorn, R.A., Bowen, G.L., & Blau, J.R. (2006). The impact of community diversity and consolidated inequality on dropping out of high school. *Family Relations, 55,* 105-118.

*Vegas, E., Murnane, R.J., & Willett, J.B. (2001). From high school to teaching: Many steps, who makes it? *Teachers College Record, 103,* 427-449.

*Velez, W. (1989). High school attrition among Hispanic and Non-Hispanic white youths. *Sociology of Education, 62,* 119-133.

*Ward, C. (1995). American-Indian high school completion in rural southeastern Montana. *Rural Sociology, 60,* 416-434.

Warren, J.R. (2002). Reconsidering the relationship between student employment and academic outcomes: A new theory and better data. *Youth & Society, 33,* 366-393.

*Warren, J.R. & Cataldi, E.F. (2006). A historical perspective on high school students' paid employment and its association with high school dropout. *Sociological Forum, 21,* 113-143.

*Warren, J.R. & Edwards, M.R. (2005). High school exit examinations and high school completion: Evidence from the early 1990s. *Educational Evaluation and Policy Analysis, 27,* 53-74.

*Warren, J.R. & Jenkins, K.N. (2005). High school exit examinations and high school dropout in Texas and Florida, 1971-2000. *Sociology of Education, 78,* 122-143.

*Warren, J.R., Jenkins, K.N., & Kulick, R.B. (2006). High school exit examinations and state-level completion and GED rates, 1975-2002. *Educational Evaluation and Policy Analysis, 28,* 131-152.

*Warren, J.R. & Lee, J.C. (2003). The impact of adolescent employment on high school dropout: Differences by individual and labor-market characteristics. *Social Science Research, 32,* 98-128.

*Wehlage, G.G. & Rutter, R.A. (1986). Dropping out: How much do schools contribute to the problem? *Teachers College Record, 87,* 374-392.

Wehlage, G. G., Rutter, R. A., Smith, G. A., Lesko, N., & Fernandez, R. R. (1989). *Reducing the risk: Schools as communities of support*. New York: Falmer Press.

*White, M.J. & Kaufman, G. (1997). Language use, social capital, and school completion among immigrants and native-born ethnic groups. *Social Science Quarterly, 78,* 385-398.

*Wilson, K. (2000). Using the PSID to study the effects of school spending. *Public Finance Review, 28,* 428-451.

*Wilson, K. (2001). The determinants of educational attainment: Modeling and estimating the human capital model and education production functions. *Southern Economic Journal, 67,* 518-551.

*Wilson, K., Wolfe, B., & Haveman, R. (2005). The role of expectations in adolescent schooling choices: Do youths respond to economic incentives? *Economic Inquiry, 43,* 467-492.

*Wojtkiewicz, R.A. (1993). Duration in parental structures and high school graduation. *Sociological Perspectives, 36,* 393-414.

*Wojtkiewicz, R.A. (1993). Simplicity and complexity in the effects of parental structure on high school graduation. *Demography, 30,* 701-717.

*Wojtkiewicz, R.A. & Donato, K.M. (1995). Hispanic educational attainment: The effects of family background and nativity. *Social Forces, 74,* 559-574.

*Worrell, F.C. & Hale, R.L. (2001). The relationship of hope in the future and perceived school climate to school completion. *School Psychology Quarterly, 16,* 370-388.

*Yamada, T., Kendix, M., & Yamada, T. (1996). The impact of alcohol consumption and marijuana use on high school graduation. *Health Economics, 5,* 77-92.

*Yin, Z.N. & Moore, J.B. (2004). Re-examining the role of interscholastic sport participation in education. *Psychological Reports, 94,* 1447-1454.

*Zhan, M. & Sherraden, M. (2003). Assets, expectations, and children's educational achievement in female-headed households. *Social Service Review, 77,* 191-211.

*Zimmerman, M.A. & Schmeelk-Cone, K.H. (2003). A longitudinal analysis of adolescent substance use and school motivation among African American youth. *Journal of Research on Adolescence, 13,* 185-210.

Zimmer-Gembeck, M.J. & Mortimer, J.T. (2006). Adolescent work, vocational development, and education. *Review of Educational Research, 76,* 537-566.

*Zsembik, B.A. & Llanes, D. (1996). Generational differences in educational attainment among Mexican Americans. *Social Science Quarterly, 77,* 363-374.

Figure 1
Conceptual Model of High School Performance

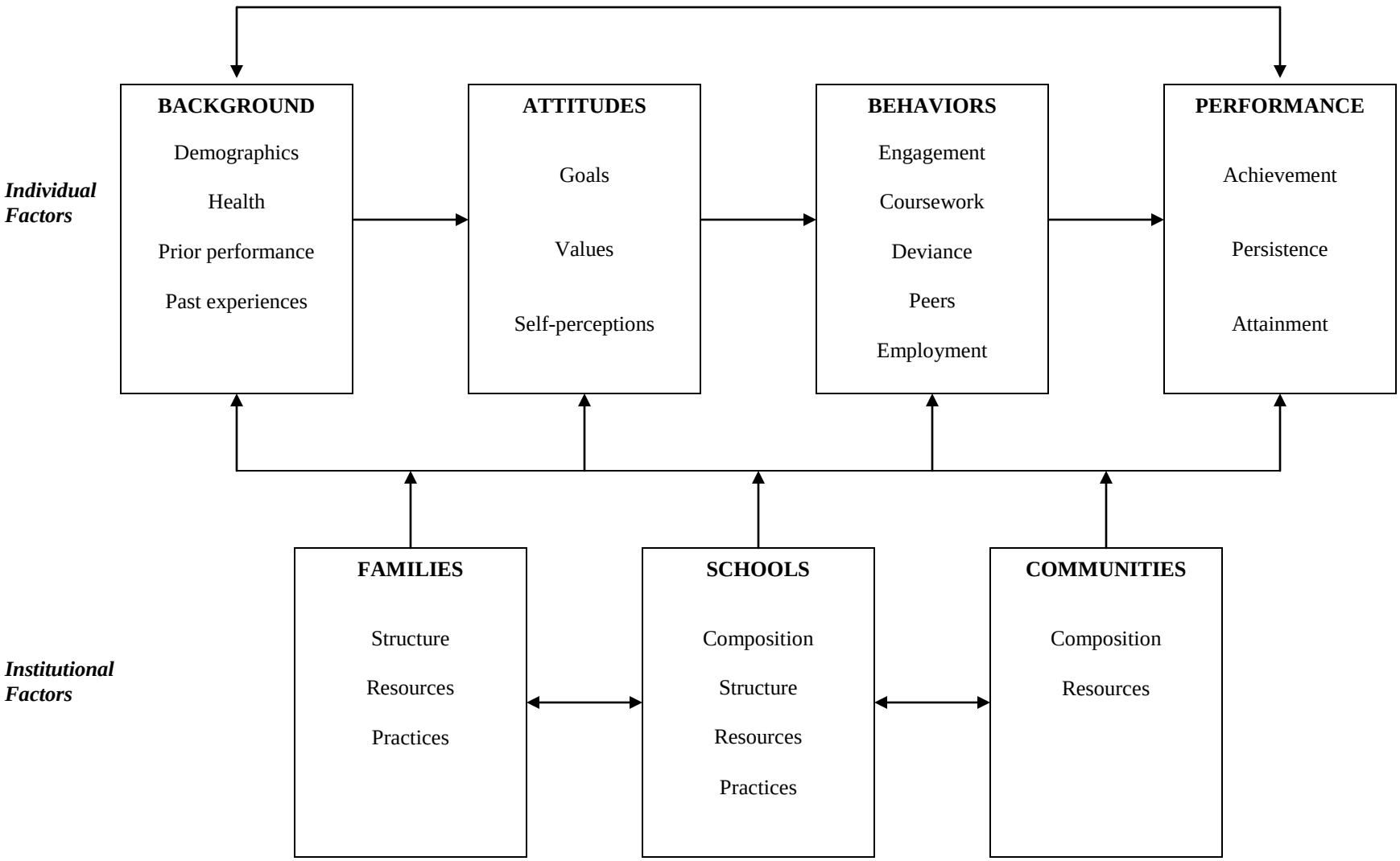

Table 1 Selected Characteristics of Analyses

	Dropout			Graduation	Completion	Total
	8-10	10-12	8-12			
Total	***13***	***89***	***155***	***84***	***48***	***389***
Predictors						
High school		69	77	58	29	233
Middle school	13	17	61	12	10	113
Preschool/elementary		3	17	14	9	43
Geography and data sets						
NATIONAL	10	78	105	80	33	306
NELS	10	20	31	10	3	74
HSB		51		8	1	60
PSID			15	14	4	33
NLSY79		1	19	27	13	60
NLSY97		1	5	1		7
NLSYM		1		2		3
NLSYW		1		2		3
NLSY-Child				2		2
NCS			2			2
NLTS			1			1
NSFH				2	5	7
NHSDA			1			1
NSC			1	1		2
Add Health			8			8
Census		1		8	1	10
CPS		1	9		3	13
CCD			3	3	1	7
HSES		1				1
State & Metropolitan Area Data Book			1			1
ADES			1			1
PUMS			8			8
ARF					2	2
STATE		1	9	1	1	12
New York			1			1
Alabama			1			1
Ohio			2			2
Texas			2			2
Florida		1	2		1	4
Oregon				1		1
Illinois			1			1
LOCAL	3	11	50	10	18	92

DATA SOURCES:
NELS: National Education Longitudinal Study of 1988
HSB: High School and Beyond
PSID: Panel Study of Income Dynamics
NLSY79: National Longitudinal Survey of Youth, 1979
NLSY97: National Longitudinal Survey of Youth, 1997
NLSYM: National Longitudinal Survey of Young Men
NLSYW: National Longitudinal Survey of Young Women
NLSY-Child: National Longitudinal Survey of Youth-Child Survey
NCS: National Comorbidity Survey
NLTS: National Longitudinal Transition Study of Special Education Students
NSFH: National Survey of Families and Households
NHSDA: National Household Survey of Drug Abuse
NSC: National Survey of Children
Add Health: National Longitudinal Study of Adolescent Health
Census
CPS: Current Population Survey (Census)
CCD: Common Core Data (U.S. Department of Education)
HSES: High School Effectiveness Survey (part of NELS)
State & Metropolitan Area Data Book (Census)
ADESL: Annual Digest of Education Statistics
PUMS: Public Use Microdata Samples
ARF: 1991 Bureau of Health Professions Area Resource File

Table 2 Individual Predictors of Dropout and Graduation by School Level

DOMAIN **Factor** • **Indicator**	**Pre-school/ Elementary School**	**Middle School**	**High School**	**Total**
EDUCATIONAL PERFORMANCE				
Academic achievement				
• Test scores	0 (+) 6 (NS) 1 (-)	1 (+) 10 (NS) 24 (-)	0 (+) 21 (NS) 30 (-)	93
• Grades	1 (+) 5 (NS) 4 (-)	0 (+) 10 (NS) 39 (-)	1 (+) 10 (NS) 34 (-)	104
• Failed courses	0 (+) 0 (NS) 0 (-)	1 (+) 0 (NS) 0 (-)	1 (+) 0 (NS) 0 (-)	2
Persistence				
• Mobility	8 (+) 6 (NS) 0 (-)	9 (+) 4 (NS) 0 (-)	10 (+) 4 (NS) 0 (-)	41
Attainment				
• Retention	37 (+) 10 (NS) 3 (-)	2 (+) 1 (NS) 0 (-)	0 (+) 2 (NS) 0 (-)	55
• Overage	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	3 (+) 0 (NS) 1 (-)	4
• Age	0 (+) 0 (NS) 0 (-)	12 (+) 6 (NS) 7 (-)	30 (+) 10 (NS) 12 (-)	77
• Academic risk	0 (+) 0 (NS) 0 (-)	9 (+) 0 (NS) 0 (-)	3 (+) 0 (NS) 0 (-)	12
BEHAVIORS				
Engagement				
• Composite measures	0 (+) 2 (NS) 1 (-)	1 (+) 20 (NS) 10 (-)	0 (+) 11 (NS) 24 (-)	69
• Absenteeism	1 (+) 2 (NS) 0 (-)	13 (+) 0 (NS) 0 (-)	13 (+) 4 (NS) 2 (-)	35
• Extracurricular activities	0 (+) 0 (NS) 0 (-)	1 (+) 4 (NS) 2 (-)	1 (+) 11 (NS) 14 (-)	33
Coursetaking				
• College track/ academic courses	0 (+) 0 (NS) 0 (-)	0 (+) 2 (NS) 0 (-)	1 (+) 4 (NS) 8 (-)	15
• Vocational courses	0 (+) 0 (NS) 0 (-)	1 (+) 0 (NS) 0 (-)	1 (+) 3 (NS) 2 (-)	7

Deviance				
• School misbehavior	1 (+) 0 (NS) 0 (-)	14 (+) 3 (NS) 0 (-)	14 (+) 12 (NS) 5 (-)	49
• Delinquency	0 (+) 0 (NS) 0 (-)	3 (+) 1 (NS) 0 (-)	8 (+) 6 (NS) 1 (-)	19
• Drug/alcohol use	0 (+) 0 (NS) 0 (-)	11 (+) 6 (NS) 2 (-)	17 (+) 6 (NS) 0 (-)	42
• Childbearing	0 (+) 0 (NS) 0 (-)	2 (+) 2 (NS) 0 (-)	50 (+) 12 (NS) 0 (-)	66
Peers				
• Friends drop out/ deviant	0 (+) 0 (NS) 0 (-)	2 (+) 12 (NS) 0 (-)	4 (+) 1 (NS) 1 (-)	20
Employment				
• Hours worked	0 (+) 0 (NS) 0 (-)	2 (+) 0 (NS) 0 (-)	7 (+) 7 (NS) 0 (-) 4 (+/-)	20
• Works>20 hours per week	0 (+) 0 (NS) 0 (-)	1 (+) 0 (NS) 0 (-)	6 (+) 10 (NS) 0 (-)	17
ATTITUDES				
Goals				
• Educational expectations	0 (+) 3 (NS) 0 (-)	0 (+) 15 (NS) 23 (-)	2 (+) 6 (NS) 33 (-)	82
Self-perceptions				
• Self-concept	0 (+) 1 (NS) 0 (-)	0 (+) 5 (NS) 0 (-)	0 (+) 2 (NS) 0 (-)	8
• Self-esteem	0 (+) 0 (NS) 0 (-)	0 (+) 2 (NS) 0 (-)	2 (+) 5 (NS) 0 (-)	9
• Locus of control	1 (+) 0 (NS) 0 (-)	0 (+) 4 (NS) 1 (-)	3 (+) 13 (NS) 0 (-)	22
BACKGROUND				
Demographics				
• Female	1 (+) 12 (NS) 9 (-)	20 (+) 44 (NS) 6 (-)	20 (+) 55 (NS) 27 (-)	194
• Ethnic minority (Black)	2 (+) 11 (NS) 4 (-)	3 (+) 30 (NS) 16 (-)	5 (+) 53 (NS) 38 (-)	162
• Ethnic minority (Hispanic)	0 (+) 2 (NS) 1 (-)	6 (+) 30 (NS) 3 (-)	12 (+) 52 (NS) 15 (-)	121
• Ethnic minority (Native American)	0 (+) 0 (NS) 0 (-)	3 (+) 8 (NS) 1 (-)	2 (+) 5 (NS) 0 (-)	19

• Ethnic minority (Asian)	0 (+) 0 (NS) 0 (-)	0 (+) 24 (NS) 4 (-)	0 (+) 7 (NS) 5 (-)	40
• Immigration status	0 (+) 1 (NS) 0 (-)	0 (+) 7 (NS) 4 (-)	5 (+) 7 (NS) 2 (-)	26
• English proficiency	0 (+) 0 (NS) 0 (-)	1 (+) 7 (NS) 3 (-)	0 (+) 0 (NS) 2 (-)	13
Health				
• Good health	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 1 (-)	0 (+) 0 (NS) 2 (-)	3
• Psychological problem	0 (+) 0 (NS) 0 (-)	3 (+) 1 (NS) 0 (-)	3 (+) 0 (NS) 0 (-)	7
Past experiences				
• Preschool	0 (+) 8 (NS) 4 (-)	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	12

Table 3 Institutional Predictors of Dropout and Graduation by School Level

DOMAIN Factor • Indicator	Pre-school/ Elementary School	Middle School	High School	Total
FAMILIES				
Structure				
• Intact family	0 (+) 6 (NS) 0 (-)	0 (+) 8 (NS) 8 (-)	0 (+) 31 (NS) 36 (-)	89
• Non-Intact family	3 (+) 10 (NS) 0 (-)	23 (+) 17 (NS) 1 (-)	45 (+) 30 (NS) 2 (-)	131
• Family stress or change	7 (+) 1 (NS) 0 (-)	2 (+) 4 (NS) 1 (-)	4 (+) 8 (NS) 0 (-)	27
• Residential mobility	10 (+) 3 (NS) 0 (-)	8 (+) 2 (NS) 0 (-)	6 (+) 1 (NS) 0 (-)	30
• Family size	3 (+) 6 (NS) 0 (-)	9 (+) 16 (NS) 0 (-)	60 (+) 26 (NS) 0 (-)	120
• Maternal employment	0 (+) 8 (NS) 2 (-)	0 (+) 4 (NS) 0 (-)	2 (+) 27 (NS) 4 (-)	47
Resources				
• Socioeconomic status	0 (+) 3 (NS) 6 (-)	0 (+) 5 (NS) 33 (-)	0 (+) 21 (NS) 27 (-)	95
• Parental education (Level)	0 (+) 0 (NS) 4 (-)	0 (+) 15 (NS) 21 (-)	0 (+) 20 (NS) 42 (-)	102
• Parental education<HS	3 (+) 1 (NS) 0 (-)	1 (+) 2 (NS) 0 (-)	15 (+) 4 (NS) 0 (-)	26
• Parental education >=College graduate	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 9 (-)	0 (+) 4 (NS) 4 (-)	17
• Family income	1 (+) 11 (NS) 8 (-)	1 (+) 12 (NS) 17 (-)	2 (+) 23 (NS) 35 (-)	110
Practices				
• Parental expectations	0 (+) 4 (NS) 0 (-)	1 (+) 5 (NS) 7 (-)	2 (+) 2 (NS) 8 (-)	29
• Parenting practices	0 (+) 3 (NS) 12 (-)	0 (+) 16 (NS) 14 (-)	0 (+) 12 (NS) 8 (-)	65
• Sibling dropped out	0 (+) 0 (NS) 0 (-)	2 (+) 1 (NS) 0 (-)	2 (+) 0 (NS) 0 (-)	5

SCHOOLS				
Student composition				
• Mean SES	0 (+) 0 (NS) 0 (-)	1 (+) 3 (NS) 3 (-)	0 (+) 3 (NS) 2 (-)	12
• Percent poverty	0 (+) 0 (NS) 0 (-)	2 (+) 6 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	8
• Percent minority	0 (+) 0 (NS) 0 (-)	6 (+) 4 (NS) 0 (-)	1 (+) 0 (NS) 0 (-)	11
Structure				
• Location (urban)	0 (+) 0 (NS) 0 (-)	1 (+) 4 (NS) 1 (-)	2 (+) 3 (NS) 1 (-)	12
• School size (large)	0 (+) 0 (NS) 1 (-)	1 (+) 3 (NS) 0 (-)	3 (+) 6 (NS) 3 (-)	17
• Control (Public)	0 (+) 0 (NS) 0 (-)	1 (+) 1 (NS) 0 (-)	5 (+) 8 (NS) 0 (-)	15
• Control (Private)	1 (+) 0 (NS) 0 (-)	1 (+) 2 (NS) 1 (-)	0 (+) 2 (NS) 2 (-)	9
• Control (Catholic)	0 (+) 0 (NS) 0 (-)	0 (+) 2 (NS) 3 (-)	0 (+) 7 (NS) 7 (-)	19
Resources				
• Pupil-teacher ratio	1 (+) 1 (NS) 0 (-)	0 (+) 4 (NS) 1 (-)	4 (+) 3 (NS) 0 (-)	14
• Teacher quality	0 (+) 0 (NS) 0 (-)	0 (+) 3 (NS) 3 (-)	0 (+) 3 (NS) 0 (-)	9
Practices				
• Student-teacher relations	0 (+) 0 (NS) 0 (-)	2 (+) 0 (NS) 3 (-)	0 (+) 0 (NS) 1 (-)	6

COMMUNITIES				
Composition				
• Percent unemployed	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	3 (+) 18 (NS) 1 (-)	22
• Percent poverty	0 (+) 5 (NS) 0 (-)	1 (+) 2 (NS) 0 (-)	0 (+) 1 (NS) 3 (-)	12
• Mean income	2 (+) 5 (NS) 0 (-)	0 (+) 1 (NS) 0 (-)	0 (+) 1 (NS) 1 (-)	10
• Neighborhood disadvantage	0 (+) 0 (NS) 0 (-)	4 (+) 3 (NS) 1 (-)	2 (+) 1 (NS) 0 (-)	11
• Percent Black	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	0
• Percent Hispanic	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	0
• Female-headed families	2 (+) 0 (NS) 0 (-)	0 (+) 0 (NS) 0 (-)	1 (+) 3 (NS) 0 (-)	6

Appendix Table 1_Characteristics of Studies

Citation	Sample	Method	Outcome	Predictors
Ahn (1994)	14-21 women from 1979 through 1987, nationally (NLSY79) N= 5,541	Proportional hazard regression	High school completion	**Student**: First birth time, Demographics **Family**: Parental education, Family structure, Number of siblings, Maternal employment
Ahrens et al. (1990)	16 to 71 aged males evaluated at the State Reception and Diagnostic Center in Topeka, Kansas N=1,757	Discriminant function analysis	High school completion	**Student**: Achievement, Substance abuse
Ainsworth & Roscigno (2005)	8th grade students nationally from 1988 (NELS)	Logistic regression	High school dropout rate	**Student**: Demographics, Achievement, Attitudes, Behaviors **Family**: SES, Family structure
Alexander et al. (1997)	1st graders in 22 Baltimore public schools from 1982 (BBS) N=790 J=20	Cluster regression	Dropouts 9th-14th (two year beyond high school for on-time graduates)	**Student**: Demographics, Behaviors, Attitudes, Academic background **Family**: Family structure, Family size, SES, Attitudes, Structure, Family change/stress, Parenting practices, Parental expectations
Alexander et al. (2001)	1st graders in 22 Baltimore public schools from 1982 (BBS) N=790	Logistic regression	Dropouts 9th grades-5years after the group's expected high school graduation	**Student**: Demographics, Achievement, Academic background, behaviors, Attitudes **Family**: SES, Family structure, Teen mom, Maternal employment, Family change, Parental expectations
Alexander et al. (2007)	1st graders in 22 Baltimore public schools from 1982 (BBS) N=790	Logistic regression	Permanent dropout	**Student**: Demographics, Achievement, Academic background, behaviors, Attitudes **Family**: SES, Family structure, Teen mom, Maternal employment, Family change, Parental expectation

Citation	Sample	Method	Outcome	Predictors
Allensworth (2005)	8th graders in each year from 1992 to 1998, in Chicago (CPS) N= 113,937	HGLM	Dropouts	**Student**: Demographics, Academic background, Achievement **Family**: SES, Poverty
Alpert & Dunham (1986)	Academically marginal youths (high school years) in Florida N=127	Discriminant function analysis	School dropouts before completing the 10th grade	**Student**: Behaviors **Family**: Parent expectation
Anguiano (2004)	8th grade students nationally from 1988 (NELS)	HLM	High school completion	**Student**: Ethnics **Family**: Family structure, Parental education, Parental involvement, Family income, Parents' years in the United States
Aquilino (1996)	19 to 34-year-old respondents, nationally in 1988 (NSFH) N=	Logistic regression	High school completion	**Student**: Demographics **Family**: Family size, Family structure, Mother's education, Family received welfare
Arum (1998)	10th grade students nationally from 1980 (HSB)	Logistic regression	High school graduation	**Student**: Demographics, Attitudes, Achievement, course track **Family**: Family structure, Family size, Parental education, Family income, Parental occupation **Community**: Unemployment, School resources **State**: Vocational resources
Astone & McLanahan (1991)	10th graders nationally from 1980 (HSB) N= 10,434	Probit regression	Never dropout & completion	**Student**: Demographics, Achievement **Family**: SES, Family size Family structure, Parenting practices
Astone & McLanahan (1994)	10th graders nationally from 1980 (HSB) N= 10,434	Multinominal logistic regression	Dropouts 10-12	**Student**: Demographics **Family**: Residential mobility

Citation	Sample	Method	Outcome	Predictors
Astone & Upchurch (1994)	Women who were between the ages of 25 and 65 in 1985 nationally (PSID) N=344/163 (White/ Black born between 1920 and 1929) N=571/ 302 (White/ Black born between 1930 and 1944) N= 981/ 694 (White/ Black born between 1945 and 1960)	Event history model	High school dropout	**Family**: Family structure, Family size, Mothers' education **Community**: Community size,
Balfanz et al. (2007)	Students enrolled in sixth grade in 1996-97 over an 8-year period through to 2003-04, in the school district of Philadelphia N= 12,972	Multivariate logistic regression	Graduated on time Graduated 1 year later Not graduated	**Student**: Demographic, Behaviors, Achievement, Academic background, Absenteeism, Failing classes
Barbaresi et al. (2007)	Children with research identified AD/HD from a 1976-1982 & non-AD/HD control children in Rochester N (AD/HD)= 370 N (non-AD/HD)= 740	Logistic regression	School dropout	**Student**: Demographics (race, year of birth)
Barnard (2004)	1st-6th graders in inner-city Chicago since 1986 (CLS) N=1,165	Logistic regression	Dropouts by age 20/ high school completion	**Student**: Demographics, Academic background **Family**: Demographics
Battin-Pearson et al. (2000)	8th graders in Seattle (multiethnic urban sample & high-crime neighborhoods) N= 770	SEM	Dropout by the end of 10th grade	**Student**: Demographics, Behaviors, Achievement **Family**: Parent expectation **School**: Composition, Peers

Citation	Sample	Method	Outcome	Predictors
Bear et al. (2006)	Boys with LD from two adjacent rural county school districts in a southeastern N= 76	MANOVA	High school completion	**Student**: Achievement, Attitudes
Bedard (2001)	Men aged 14-19 in 1966 and women aged 14-19 in 1968 nationally (NLSYM & NLSYW)	Ordered probit model	(1) High school dropout (2) High school graduation (3) University attendees	**Student**: Demographic, Achievement **Family**: Family structure, Parental education, Family size, Newspaper & library card
Bedard & Do (2005)	Unified districts that serve kindergarten though grade 12 nationally (CCD)	Regression	District level high school completion (on-time high school completion)	**District**: Number of schools, Administrators/ teacher/guidance counselors/teachers' aides per pupil, Middle school adoption, % in middle schools
Beller & Chung (1992)	Mother with her eldest child between the ages of 16 and 20 in 1984 nationally (CPS) N= 4974 children	Logistic regression	Probability of completion of high school among children 18-20 years old	**Student**: Demographics **Family**: family structure, Maternal employment, Siblings, Family income, Mother's education
Benz et al. (2000)	Youth with disabilities in Oregon up through the 1997/98 N= 709	Logistic regression	High school graduation	**Student**: Demographics, Academic background, Behaviors,
Bernburg & Krohn (2003)	7-8th grades of the public schools in Rochester, New York during 1987-1988	Logistic regression	High school graduation	**Student**: Demographics, Achievement, Behaviors, Delinquency **Family**: Parental poverty
Betts & Grogger (2003)	10th graders nationally from 1980 (HSB)	Linear probability model	High school graduation	**Student**: Demographics, Achievement **Family**: Parental occupation, Parental education, Family income, Family structure, Family size

Citation	Sample	Method	Outcome	Predictors
Bickel & Papagiannis (1988)	67 counties in Florida	Multiple regression analysis	High school completion rates	**District**: Composition, Median family income, District size, Average composite score, student-teacher ratio, Average teacher salary, Teacher quality, Percent of students in curricular
Bohon et al. (2007)	Mothers and adolescents assessed annually from 6th through 12th N= 240	Logistic regression	High school dropout	**Student**: IQ, Behaviors **Family**: Mother's depressive episodes, Mother's educational attainment, SES, Family structure
Boggess (1998)	Age 17 respondents between 1969 and 1985, nationally (PSID) N= 3,635	Logistic regression	High school. completion	**Student**: Demographics **Family**: Family structure, Family size, Family income, Years in poverty, Parental education, Employment experience of the household during high school, Maternal employment
Bray et al. (2000)	Adolescents aged 16-18 years in a southeastern US public school system N=1,392	Logistic regression	Dropping out of high school	**Student**: Demographics, Achievement, Substance use **Family**: Family structure, Parents' education
Brooks-Gunn et al. (1993)	Women aged between 14-19 from 1968 to 1985, nationally (PSID) N=2,200	Ordinary least squares regression	High school dropouts	**Family**: Family income, Mother's education, Family structure, Mother's race **Neighbor**: Composition
Bryk & Thum (1989)	10th graders nationally from 1980 (HSB) N= 4,450 J= 160	HLM	Dropouts 10-12	**Student**: Demographics **Family**: SES **School**: Composition, Resources, Academic climate, Disciplinary climate, Teaching quality

Citation	Sample	Method	Outcome	Predictors
Cabrera & Nasa (2001)	8th-12th grade students nationally (NELS) N= 16,489	Logistic regression	12th-grade dropout status	**Student**: Demographics, Attitude, Achievement **Family**: SES, Parental expectation, Parenting practices
Cairns et al. (1989)	7th graders enrolled in one of three middle schools located in three different communities in 1982-1983 & 1983-1984 N= 475	Multiple logistic regression	7-11th dropouts	**Student**: Demographics **Family**: SES
Carbonaro (1998)	8th-12th grade students nationally (NELS) N= 16,489	Logistic regression	12th-grade dropout status	**Student**: Demographics, Achievement, Attitudes **Family**: SES level, Parental involvement
Carr et al. (1996)	16-19 aged youth in 1979 nationally (NLSY79) N= 2,716	Logistic regression	High school completion	**Student**: Demographics, Cognitive ability, Educational expectations, Highest grade completed , Number of weeks or hours worked **Family**: Family poverty status, Parental education
Chavous et al. (2003)	African American 17-year-old adolescents from the four main public high schools in the second largest school district in Midwestern state N= 606	Cluster analysis	High school completion	**Student**: Demographics, Educational beliefs, Achievement **Family**: Mother's education
Clampet-Lundquist (1998)	18-24 years old males & females in Philadelphia (1990 Census & PDPH) N=1,702	Nonlinear regression	Noncompletion of high school	**Community**: Composition, Median income, Unemployment, Professional/managerial residents

Citation	Sample	Method	Outcome	Predictors
Clements et al. (2004)	Low income & minority youth from the Chicago in 1985 and 1986 (CLS) N= 1539	HLM	High school completion by age 21	**Student**: Demographics, Academic background, Family risk index **School**: Preschool instructional approach, Site location, Parenting practices, % school low-income, % family stability
Coleman & DeLeire (2003)	8th grade students from 1980 nationally (HSB)	Probit regression	High school dropout	**Student**: Demographic, Attitudes, Achievement **Family**: Parental education, Parenting practices, family structure, family income
Connell et al. (1995)	7th- 9th graders (African Americans) in New York urban schools, 1987-1988 N= 225 (males)/ 218 (females)	Path analysis	Staying in high school	**Student**: Behaviors
Crane (1991)	16-19 year olds females nationally in 1970 (PUMS) N= 92,512	Logistic regression	Dropping-out rates	**Community**: % of workers in the neighborhood who held professional or managerial jobs
Croninger & Lee (2001)	8th graders nationally from 1988 (academically at-risk students/ non-at risk students) (NELS) N= 7,513/ 3,466	Logistic regression	10-12 dropouts	**Student**: Demographics, Attitude, Behaviors, Achievement, Academic background **School**: Resources
Crowder & South (2003)	Black and white PSID members who were between the ages 14 and 19 between 1968 and 1993, nationally (PSID) N (black)= 3,067 N (white)= 3,689	Logistic regression	Dropout	**Student**: Demographics **Family**: Family structure, Family size, Parent's education, Family income, Home ownership, **Community**: Neighborhood disadvantage index

Citation	Sample	Method	Outcome	Predictors
Crowder & Teachman (2004)	Adolescence aged 13-19, nationally (PSID) N= 1,643	Discrete-time event history model	Whether respondents made their final exit from school prior to graduation	**Student**: Demographics **Family**: Family structure, Family income, Parental education, Siblings **Community**: Composition
D'Amico (1984)	9-12th graders nationally (NLSY79) N= over 5,000	Probit regression	High school dropout	**Student:** Hispanic, Education expectation, Work intensity **Family**: Family structure, Parental education, Family size
Daniel et al. (2006)	10th-grade adolescents in six public high schools in the southeastern portion of the United States N= 188	Multivariate models	10-12 dropouts	**Student**: Demographics, SES, Assessment of reading difficulties
Davis et al. (2002)	14-17 year African American students in a large urban high school in the Midwest N= 166	Path analysis	High school graduation	**Student**: Attitudes, Behaviors
Driscoll (1999)	Hispanic 8th grade students, nationally (NELS)	Logistic regression	High school dropouts	**Student**: Generation, Demographics, Attitudes, Achievement, Academic background **Family**: Family structure, Family income, Parental education, Family size, Parental educational expectations, Home resources, Family national origin
Dunham & Wilson (2007)	8th graders between 1988 and 1996 nationally (NELS) N= 2,998 (dropout)/ 2,995 (nondropout)	Logistic regression	High school dropouts	**Student**: Demographics, SES **Family**: Monitoring, Family structure, Parent practices **School**: Types of school

Citation	Sample	Method	Outcome	Predictors
Dunn et al (2004)	Disability students in Alabama between 1996 and 2001 N= 1654/ J=29	Hierarchical logistic regression	High school dropouts	**Student**: Demographics, Post school interview responses (general preparation, helpful class, helpful person)
Eckstein & Wolpin (1999)	14-21 years of age students nationally (NLSY79)	Logistic regression	High school completion	**Family**: Family income, Parental education, Family structure, Family size,
Eide & Showalter (2001)	10th graders nationally from 1980 (HSB)	Ordinary least squares regression	High school dropout	**Student:** Grade retention **Family**: Parental education, Family income
Ekstrom et al. (1986)	10th graders nationally from 1980 (HSB) N= 4,450	Path analysis	10-12 dropouts	**Student**: Demographics, Achievement **Family**: SES
Ellickson et al. (1998)	7th grade-12 grade adolescents from California and Oregon from 1985 to 1990 N=4390	Logistic regression	High school dropout	**Student**: Demographics, Academic background, Achievement, Attitudes, Behaviors, Alcohol/ drug use **Family**: Parental education, Family structure, Mother's employment **School**: Composition, Prevalence of school drug use
Ensminger et al. (2003)	1st graders in poor community on the South Side of Chicago in 1966- 1967 (99% of the study participants were African American) N=879	Logistic regression	High school dropouts (10-12th)	**Student**: Behaviors **Family**: Poverty, Family structure, Parental education, Teen mom, Residential mobility, Family stress
Ensminger et al. (1996)	1st graders in poor community on the South Side of Chicago in 1966- 1967 (99% of the study participants were African American) N= 1,242 (original)/ 954 (1992-1993)	Path analysis	High school graduation	**Student**: First grade grades, First grade behavior, adolescent problem behaviors **Family**: Family income, Mother's education, Parent practice, Family residential mobility **Neighborhood**: Composition, Percent below the poverty level

Citation	Sample	Method	Outcome	Predictors
Ensminger & Slusarcick (1992)	1st graders in poor community on the South Side of Chicago in 1966-1967 (99% of the study participants were African American) N= 1,242	SEM	High school dropouts	**Student**: Behaviors, Achievement **Family**: Mother education, Poverty, Family structure, Teen mom, Parenting practices, Parental expectation
Entwisle et al. (2004)	Age 6 to age 22 in Baltimore from 1982 (BSS) N= 573	Logistic regression	High school completion by age 22 among Dropouts	**Student**: Demographics, Achievement, Academic background, Attitude, SES, Parenthood by age 18, Employment
Entwisle et al. (2005)	Age 6 to age 22 in Baltimore from 1982 (BSS) N=639	Multinominal logistic regression	Age 16 dropout Age 17 dropout Age 18 dropout	**Student**: Demographics, School performance, SES, Attitude, Academic background, Working status
Entwisle et al. (2005)	Age 6 to age 22 in Baltimore from 1982 (BSS) N= 632	Mutlinominal logistic regression	High school dropout	**Student**: Demographics, Achievement, Attitude **Family**: SES, Parent support **Community**: Poor neighborhood
Evans et al. (1992)	14-21 year old women nationally from 1979 (NLSY79) N=1,453	Probit regression	High school dropouts	**Student**: Demographics, Academic background **Family**: Family structure, Family income, Parent education **School**: Resources
Evans & Schwab (1995)	10^{th} graders nationally from 1980 (HSB) N= 13,294	Ordinary least squares regression	High school graduation	**Student**: Demographics, Achievement **Family**: Family income, Parental education, Family structure
Fagan & Pabon (1990)	$9\text{-}12^{th}$ graders in six inner-city neighborhoods form A- and B-level SMSAs from 1982 (predominantly Black and Hispanic) (CLS)	Logistic regression	High school dropout	**Student**: Demographics, Behaviors **School**: Social environment

Citation	Sample	Method	Outcome	Predictors
Farahati et al (2003)	19-54 old men & women nationally (NCS) N= 1,632(M)/ 1,757(F)	Multivariate logistic regression	Dropouts (less than 12 years of schooling)	**Student**: Demographics **Family**: Family structure, Parental education, Family size, Family income **Community**: Unemployment rate
Farmer et al. (2003)	7th grader in three communities of North Carolina in 1982-1983 N= 475	t-test & Chi-square tests	Dropout	**Student**: Demographics, Peer relations
Fernandez et al. (1989)	10th graders nationally from 1980 (HSB) N= 9,608(non-Hispanic white male)/ 9,687(non-Hispanic White female)/ 1,825 (non-Hispanic Blacks male)/ 2,089 (non-Hispanic Blacks female)/ 2,280(Hispanics males)/ 2,210(Hispanics females)	Logistic regression	10-12 dropouts	**Student**: Demographics, Behaviors, Achievement **Family**: SES, family size, family structure
Finn & Rock (1997)	8-12th grade minority students (African-American and Hispanic) from low-income homes from 1988 (NELS) N=1,803	MANOVAs MANCOVAs	Persistence from grade 8 through grade 12	**Student**: Demographics, Attitudes, Behaviors, Achievement **Family**: SES, family structure
Finn et al. (2005)	Kindergarten –3rd grade students in Tennessee N=4948 J= 165	HLM	High school graduation	**Student**: Demographics, Achievement **Family**: Poverty **School**: School location, Enrollment
Fischer & Kmec (2004)	11-15 aged adolescents from the five Philadelphia neighborhoods in 1991 N= 372	Logistic regression	High school completion	**Student**: Demographics, Achievement **Family**: SES, Financial stability, Parental education, Family structure, Parenting practices **School**: Selective school

Citation	Sample	Method	Outcome	Predictors
Fitzpatrick & Yoels (1992)	High school students nationally (Annual Digest of Education Statistics & State and Metropolitan Area Data Book)	Ordinary least squares regression	High school dropout rates	**School**: Pupil-teacher ratio **State**: Composition, Policy
Forste & Tienda (1992)	Women aged 20 to 29 in 1987, nationally (NSFH)	Event history analysis	High school completion	**Student**: Demographics, Parenthood **Family**: Parents' education, Maternal employment, Family structure, Family size, Family received aid
Foster & McLanahan (1996)	Children from panel families who were between the ages 1 and 5 years in 1968, nationally (PSID) N= 1,288	Ordinary least squares regression	Finishing high school	**Student**: Demographics **Family**: Household head' education, Head employed, Family income **Community**: Neighborhood dropout rate
French & Conrad (2001)	8^{th} graders (N=516)/ 10^{th} graders (N=1157) from a suburban school district	Logistic regression	High school dropout	**Student**: Behavior, Achievement
Garasky (1995)	Men and women ages 14 through 21 nationally (NLSY79) N= 7,658	Probit regression	High school graduation	**Student**: Demographics **Family**: Family structure, Family size, Poverty status, Parental education
Garnier et al. (1997)	Children from upper middle-class Euro-American families in major urban areas of California since 1974-75 N= 201 J= 194 (families)	SEM	High school dropouts	**Student**: Attitude, Achievement **Family**: SES, Family stress
Ginther & Pollak (2004)	Child aged 1-1 between 1968 and 1985 nationally (NLSY, NLSY-Child)	Probit regression	High school graduation	**Student**: Demographics **Family**: Family structure, Family income, Mothers' education, Family size

Citation	Sample	Method	Outcome	Predictors
Goldschmidt & Wang (1999)	8th graders in 1988/ 10th graders in 1990 Nationally (NELS) N= 25,000/ J= 1,000 (?)	HLM	Dropouts 8-10/ dropouts 10-12	**Student**: Demographics, Behavior, Achievement **Family**: SES, Family structure, Parental education, Parent practices
Griffin & Heidorn (1996)	10-12th grade high school students from 14 school districts in Florida	Logistic regression	10-12 drpout	**Student**: Demographics, Achievement, Behaviors
Grogger (1997)	18-20 year old respondents from 1980, nationally (HSB)	Probit regression	High school graduation	**Student**: Demographics, Behaviors, **Family**: Family income, Parental education, Family structure **School**: school composition, Expenditure/ pupil, school size, school vandalism **Community:** Local violence
Grogger & Bronars (1993)	Teenage mothers with a twin first birth and a control sample of teenage mothers with a singleton first birth, nationally (Public Use Microdata Samples of the 1970 and 1980 U.S. censuses) N (mothers w/ twins)= 2,028 N (mothers w/ a singleton)= 3,938	Logistic regression	High school graduation	**Student**: Unplanned teenage birth
Hagan & Foster (2001)	7-11 grade students in 1995 nationally (Add Health) N= 13,568	Logistic regression	Dropping out of school	**Student**: Demographics, Violent behavior, Depression **Family**: Parental education, Family structure
Hannon (2003)	14-21 years old students nationally in 1979 (NLSY79) N= 6,111	Logistic regression	Dropout status	**Student**: Demographics, Achievement, Behaviors, Attitudes **Family**: Family structure, Family size

Citation	Sample	Method	Outcome	Predictors
Harding (2003)	Age 10 between 1968 and 1987 and age 20 between 1977 and 1997 (PSID)	Sensitivity analysis	High school dropout	**Student**: Demographics, **Family**: Family structure, Parental education, Family income, Teen mom **Community**: SMSA compositions , Neighborhood poverty rate
Haurin (1992)	14 to 21 respondents in 1979 (NLSY79) N(original sample)= 12,686	Logistic regression	School dropout	**Student**: Demographics **Family**: Parental education, Teen mom, Family structure, Poverty
Haveman et al. (1991)	4 years or younger nationally in 1968 (PSID) N= 1,258	Probit regression	High school graduation	**Student**: Demographics, Academic background **Family**: Parental education, Family structure, Poverty, Mother works, Stress/change
Heck & Mahoe (2006)	8th grade students nationally (NELS) N= 12,972 J= 984	Ordinary least squares regression	Student persistence	**Student**: Demographics, Achievement, Academic background, Attitudes, Behaviors **Family**: SES **School**: Composition, Type, Location, Size, Safety
Hess & Copeland (2001)	9th grade students from two junior high schools within a suburban area in a West state N= 92	Discriminant function analysis	High school graduation	**Student**: Students' ratings of stress and coping strategies, Demographics **Family**: Parental marital status, Parental education level, Family size
Hill & Jepsen (2007)	8th graders in 1988 nationally (NELS)	Logistic regression	High school dropout	**Student**: Demographics, Behaviors, Achievement **Family**: Parental income, Mothers' education, Family structure, Family size, **School**: Composition **State**: Composition

Citation	Sample	Method	Outcome	Predictors
Hoffer (1997)	1988-1992 8-12 graders nationally (NELS) N= 11,725	Logistic regression	8-12 dropouts	**Student**: Demographics, Attitudes, Behaviors, Achievement **Family**: SES **School**: Composition, School type
Hofferth et al. (1998)	Black and white children at ages 11-16 in 1980 (PSID) N= 901	Ordinary least squares regression	High school completion	**Student**: Demographics **Family**: Mother's education, Residential mobility, Family structure, Family income
Hofferth et al. (2001)	Women before about age 29 nationally N (NLSY data)= 4,013 N (PSID data)= 3,562	Logistic regression	School completion by age 29	**Student**: Demographics, Age at first birth **Family**: Family structure, Family size, Mother's education, Maternal employment
Hoffman et al (1993)	Women with sisters who were between ages 2 and 14 in 1968 (PSID) N= 856 sisters (428 sister pairs)	Logistic regression	High school graduation	**Student**: Demographics, Teen parenthood **Family**: Mother's education, Family income
Hotz et al. (1997)	14 to 21 years old youths nationally in 1979 (NLSY 79)	Ordinary least squares regression	Attainment of high school diploma	**Student**: Demographics, Child bearing **Family**: Family income, Parental education, Family structure, Welfare
Hotz et al. (2005)	14-21 years old in 1979, nationally N= 4,926 women (NLSY79)	Ordinary least squares regression	High school graduation High school completion	**Student**: Demographics, Achievement **Family**: Family structure, Family income, Parental education
Jacob (2001)	8-12th graders attending public schools nationally (NELS) N= 12,171	Ordinary least squares regression	Dropout	**Student**: Demographics **Family:** SES, Family structure **School:** Composition, School size **State**: Composition, Credits required for graduation

Citation	Sample	Method	Outcome	Predictors
Jimerson (1999)	Children participating in the Minnesota Mother-Child Interaction Project N=190	ANOVAs	High school graduation status at age 19	**Student**: Attitudes, Behaviors, Achievement, Academic background, Early grade retention **Family**: SES, Teen mom, Parental education, Home environment
Jimerson et al. (2000)	Children & mothers received pregnantal care through public assistance at the Maternal and Infant Care Clinic of the Minneapolis Health Department (at-risk due to poverty) N= 117	Hierarchical logistic regression Discriminant function analysis	High school status (10-12th dropout) (age 19)	**Student**: Demographics, Behaviors, Achievement **Family**: SES, Parenting practices
Kaplan et al (1997)	Sample of half of the 36 junior high schools of the Houston Independent School District in 1971 N= 1,195	SEM	Dropout	**Student**: Demographics, Achievement, Behaviors **Family**: Father's education
Kaplan & Liu (1994)	7th grade students from 36 junior-senior high schools in the Houston Independent School District in 1971 N=9335	Logistic regression	Dropout	**Student**: Demographics, Attitudes, Behaviors, Achievement, Drug use
Kasen et al. (1998)	Junior & senior high school students in New York in 1985 N= 452/ J= 150	Logistic regression	High school dropout	**Student**: Demographics, Attitudes, Behaviors **Family**: SES **School**: Academic climate, Teaching quality

Citation	Sample	Method	Outcome	Predictors
Koball (2007)	Adolescent mothers between 15 and 17, nationally (NELS & NLSY97)	Ordinary least squares regression	Dropping out of school	**Student**: Demographics **Family**: Parents' education, Lives with parent **School**: school type
Koch & Mcgeary (2005)	14-21 years old in 1979, nationally (NLSY79) N= 4,749(females) 4,401(males)	Bivariate probit regression	High school completion	**Student**: Demographics, Early alcohol consumption **Family**: family structure, family size, parental education **Community**: % of local population with diploma
Kortering et al. (1992)	Learning disabled high school students in large urban school district in 1987 N= 305	Discriminant function analysis	High-school dropouts	**Student**: Demographics, Academic background **Family**: SES, Family structure
Koshal et al. (1995)	604 school districts in Ohio Data	Regression	High school dropouts	**District:** School district composition
Krohn et al. (1997)	7-8th grade students in Rochester from 1988 N=775	Logistic regression	dropout	**Student**: Demographics, Behaviors, Substance use, Peer alcohol and drug use **Family**: SES, Parental drug use
Lee & Staff (2007)	1988 8th grader nationally (NELS) N= 15,855	Logistic regression	Dropouts 10-12	**Student**: Demographics, Academic background, Achievement, Behaviors, Work intensity **Family**: Family Structure, Family size, Parental education, Mother's employment, Family income, Mother's aspirations, Parenting practices **School**: School sector, Region

Citation	Sample	Method	Outcome	Predictors
Lee & Burkam (1992)	10^{th} graders nationally from 1980 (HSB) N= 17,988/ J= 1,015	Multinomial logistic regression	Dropouts 10-12	**Student**: Demographics, Behaviors, Achievement, Academic background **Family**: SES, family structure, family size,
Lee & Burkam (2003)	1990 10^{th} graders nationally (NELS) N= 3,840/ J= 190	HLM	Dropouts 10-12	**Student**: Demographics, Behaviors, Achievement, Academic background **Family**: SES **School**: Composition, School size & type, Teaching quality
Levenstein et al. (1998)	Age 2 children who had been recruited for the Parent-Child Home Program in Pittsfield school district in 1976-1980 N= 123	Logistic regression	High school graduation	**Student:** Enrollment in the PCHP, IQ

Citation	Sample	Method	Outcome	Predictors
Levine & Painter (1999)	8th grade non-Hispanic whites or non-Hispanic whites with blacks (NELS) N= 14,662 10,073(Whites)/ 1,496(Blacks)	Logistic regression	Permanent dropping out of high school	**Student**: Demographics **Family**: Family income, Parental education, Parental employment, Family size, Family structure, Sibling dropout, Teen mom, Parenting practices **School**: Composition, School drug problem
Levine & Painter (2003)	8th grade students in 1988, nationally; (NELS) N= 14,000	Logistic regression	High school dropout	**Student**: Demographics, Behaviors, Achievement, Academic background, Child bearing **Family**: SES, Family structure, Family size, Parenting practices, Parent's expectation, Teen mom
Li (2007)	10th graders nationally from 1980 (HSB)	Bayesian proportional hazard analysis	The timing of high school dropout decisions	**Student**: Demographics, Achievement, **Family**: Parental education, Family income, Family size, Region **School**: School composition, School sources State compulsory school attendance ages **Community**: Community composition, Employment, District expenditure per pupil
Lichter et al. (1993)	Persons aged 16-24 nationally (1990 CPS) N=19,748	Logistic regression	Dropouts	**Student**: Demographics, Parental status **Family**: Poverty status, Family structure, Family size
Lillard & DeCicca (2001)	1980/ 1990 14-17 years nationally N= 14,787 (from HSB) N= 18,606 (from NELS)	Ordinary least squares regression and General least squres	Dropouts (14-17 year)	**Student**: Demographics, Behaviors, Achievement **Family**: Demographics **Community**: Unemployment rates **State**: Composition, Course graduation requirements

Citation	Sample	Method	Outcome	Predictors
Loeb & Page (2000)	High school students, nationally (PUMS)	Ordinary least squares regression	Dropout rate for states	**School**: Staff-teacher ratio, Pupil-teacher ratio **State**: Composition, Educational expenditures, Percentage of local educational expenditures, Minimum-competency test, Compulsory age of attendance
Lutz (2007)	Latino immigration groups in the USA, nationally (NELS) N= 9578	Logistic regression	High school completion	**Student**: Demographics **Family**: SES, Family structure, Family size **School**: School type
Manski et al. (1992)	Individuals age 14-17 in 1979 (NLSY79)	Probit model	High school completion	**Student**: Demographics **Family**: Parental education, Family structure
Marsh (1991)	10^{th} graders from 1980, nationally (HSB) N= 10,613	Logistic regression	10-12 dropouts	**Student**: Demographics, Attitudes, Behaviors, Achievement **Family**: SES, Parenting practices, Parent's expectations
McCluskey et al. (2002)	7^{th} and 8^{th} grade Rochester public school male students in 1988 N= 9,538	Logistic regression	High school graduation	**Student**: Demographics, Substance use, school engagement, Achievement **Family**: SES, Transition in family structure, Parental supervision
McElroy (1996)	Young black and white women in the 10^{th} and 12^{th} grades in the U.S. in 1980, nationally (HSB)	Logistic regression	High school completion	**Student**: Age at first birth, Achievement **Family**: SES, parental education, family structure **School**: School type
McNeal (1995)	10^{th} graders nationally from 1980 (HSB) N= 14,249/ J= 735	Logistic regression	10-12 dropouts	**Student**: Demographics, Behaviors **Family**: SES, Family structure

Citation	Sample	Method	Outcome	Predictors
McNeal (1997)	10th graders nationally from 1980 (HSB) N= 5,772 J= 281	HLM	Dropouts 10-12	**Student**: Demographics, Behaviors, Academic achievement, academic background **Family**: SES, Family structure
McNeal (1997)	10th graders nationally from 1980 (HSB) N=20,493	Logistic regression analysis	10-12 dropouts	**Student**: Demographics, Achievement, Attitude, Hours worked, Job type **Family**: Family structure, SES
Melnick et al. (1992)	10th graders nationally from 1980 (HSB) N= 3,686 minority youth	Multiple regression	10-12 dropouts	**Student**: Behaviors
Menning (2006)	7-12 grader nationally from 1994 (Add Health) N= 2,550	Logistic regression	School failure	**Student**: Demographics, Achievement, Behaviors **Family**: Family income, Parental education, Parenting practices, Family structure, Nonresident father variables (child support, involvement)
Mensch & Kandel (1988)	Youths aged 19-27 nationally in 1984 (NLSY 79)	Event-History analysis	High school dropout	**Student**: Demographics, Attitude, Behaviors, Substance use **Family**: Parental education, Family structure
Morris et al. (1991)	7though 12 graders in six school districts, Florida N= 785	Classification analysis	High school dropout	**Student**: Academic background, Achievement, **Family**: Family structure
Muller (1998)	10th –grade public school students nationally from 1988 (NELS) N= 3,442	Logistic regression	High school graduation	**Student**: Demographics, Attitudes, Achievement **School:** Minimum competency exam

Citation	Sample	Method	Outcome	Predictors
Neal (1997)	14-21 years old students nationally from 1979 (NLSY79)	Probit analysis	High school graduation	**Student**: Demographics **Family**: Parental education family structure **School**: School type
Newcomb et al. (2002)	8th graders in Seattle in 1985 N= 754	SES	High school failure: dropout & number of months missed from school in the 12th grade	**Student**: Demographics, Behaviors, Achievement **Family**: SES
Oettinger (2000)	Sibling pairs born between 1957 and 1964 nationally (NLSY) N= 2,255 sibling pairs	Ordinary least squares regression	High school graduation	**Student**: Demographics **Family**: family structure, Family size, Parental education, Family income **Community**: unemployment rate
Olatunji (2005)	8th grade students in 1988, nationally (NELS) N=12,700	Logistic regression	High school dropout	**Student**: Working experience, Working hours, Demographics, Achievement, Attitudes **Family**: SES
Orthner & Randolph (1999)	High school aged students and their parents from low-income households in the 1990's in North Carolina (86% African-American) N= 4,437	Event history analysis	High school dropout	**Student**: Demographics **Family**: Parent work status, Family welfare participation

Citation	Sample	Method	Outcome	Predictors
Ou (2005)	Children growing up in high-poverty neighborhoods in Chicago (CLS) N=1368	Path analysis	High school completion	**Student**: Demographics, Cognitive advantage, Family support, Social adjustment, Motivational advantage, School support **Family**: Family risk status
Ou et al. (2007)	Children growing up in high-poverty neighborhoods in Chicago (CLS) N=1368	Logistic regression	High school completion	**Student**: Achievement, Behaviors, Attitude **Family**: Demographics, Mother's education, Parental involvement in school, Parental expectation, Free school lunch eligibility, Family structure, Teen-parent status, Family size, Family public-aid receipt, Status of the child-welfare case history
Perreira et al (2006)	7-12 graders in 1994-1995 nationally (Add Health)	Logistic regression	High school dropout rates	**Student**: Demographics, Working **Family**: family structure, Family size, Parents' education, Mother' working, Parenting practices, Parental expectations **School**: School capital **Community**: Community capital
Pirog & Magee (1997)	14-21 years old students nationally from 1979 (NLSY79) N= 3,828	Probit model	Certification by 19/ certification by 26	**Student**: Demographics, Behaviors **Family**: SES, Teen mom, Parental education, Family structure, Family size **School**: Composition, Resources, School type
Pittman (1991)	10^{th} graders nationally from 1980 (HSB) N= 2,228	Path analysis	10-12 dropouts	**Student**: Behaviors, Achievement, Academic background **School**: Disciplinary climate, Peers
Pittman & Haughwout (1987)	10^{th} graders nationally from 1980 (HSB) J=744	Path analysis	10-12 dropouts	**School**: Climate, Program diversity, Size

Citation	Sample	Method	Outcome	Predictors
Pong & Ju (2000)	1988 8th graders living in two-parent households nationally (NELS) N= 11,094	Logistic regression	8-12 dropouts	**Student**: Demographics, Achievement **Family**: Demographics, Stress
Power & Steelman (1993)	10th graders nationally from 1980 (HSB)	Logistic regression	10-12 dropout	**Student**: Demographics, Achievement **Family**: Family size, Family structure, Family income, Parental expectations **School**: School type
Powers & Wojtkiewicz (2004)	Respondent aged 14 through 2 years in 1979 (NLSY79) N= 4,768	Logistic regression	High school graduation by age 25	**Student**: Demographics, Achievement, Occupational aspiration **Family**: Family structure, Siblings, Parental education,
Randolph et al. (2004)	Youths enrolled in the 9th grade and their mother received public assistance and/or required to participate in a federally funded work training program in 1993 & 1994, one urban school district in southeastern United States N= 1,260	Event history analysis	The risk or hazard rate of dropout	**Student**: Demographic, Academic background
Randolph et al. (2006)	9th graders from low-income households who were enrolled in schools in an urban district in a southeastern state N=686	Event history analysis	the risk or hazard rate of dropout(interaction of two measures: the number of days of school enrollment from the 9th grade/ dropout status	**Students**: Demographics, Academic background, Behaviors **Family**: Family income, Maternal employment
Rees & Mocan (1997)	680 public school districts (1978-1979 through 1986-1987)	Logistic regression	Proportion of a district's 9th-12th grade dropouts	**School**: Teacher quality **District**: Average county unemployment rate, Proportion of students (black, Hispanic, families receiving government support, Total district enrollment

Citation	Sample	Method	Outcome	Predictors
Renna (2007)	Students in high school nationally, in 1982 or 1983 (NLSY79) N=2513	Probit model	Graduating on time from high school	**Student**: Demographics, Binge drinking **Family**: Parental education, Family income, Family members' drinking problem **State**: Minimum legal drinking age
Reschly & Christenson (2006)	Students with LD and EBD from middle school and high school students nationally (NELS) N= 1,498	Logistic regression	Dropout status	**Student**: Achievement, Academic background, Engagement **Family**: SES
Reyes (1993)	Hispanic 10th-grade students at a large public urban high school with a predominantly Hispanic and low-income student body N= 48	ANOVAs	High school completion	**Student**: Behaviors, Achievement, Academic background **Family**: SES, Parenting practices
Reynolds et al. (2001)	Low-income, mostly black children born in 1980 and enrolled in alternative early children programs in 25 sites in Chicago, III (CLS) N= 837 (intervention G in preschool)/ 444 (comparison G in preschool	Probit and negative binomial regression	High school completion/ School dropout	**Student**: Academic background

Citation	Sample	Method	Outcome	Predictors
Reynolds et al. (2004)	Low income minority children born in 1979 or 1980 (CLS) N= 1,286	High school completion	SEM	**Student**: Demographics, Academic background, Behaviors, Achievement **Family**: Family risk status (parental education, family income, low income neighborhood, family structure, parental unemployment, family size), Parental involvement in school, Child abuse and neglect, **School**: Magnet school attendance, School mobility
Ribar (1994)	14-21 years old women in 1979 (NLSY79) N= 4,658	Probit model	High school completion	**Student**: Demographics **Family**: Family structure, Siblings, Mother's education, Mother working, **Community**: Unemployment, **State**: State per-pupil education funding, State abortion rate, PDA earnings, State monthly AFDC benefit, State monthly food stamp benefit, State monthly Medicaid benefit
Ripple & Luthar (2000)	High school students in an inner-city high school, 85% of the participants were from minority groups N=134	Multiple hierarchical regression	Dropout status	**Student**: Demographics, Intellectual functioning, Achievement, Academic background, Behaviors,
Rivkin (2001)	10^{th} graders (only women) from 1980, nationally (HSB) N= 7,655	Ordinary least squares regression	High school continuation	**Student**: Demographics, Achievement Average education of schoolmates' mothers **Family**: Family income, Parent education **Community**: Composition, Region, Unemployment

Citation	Sample	Method	Outcome	Predictors
Roderick (1994)	Public school's seventh graders in 1980-1981, Fall River, Massachusetts N=707	Discrete-time event history analysis	School leaving age 16 to 19	**Student**: Demographics, Academic background,Retention, Achievement, Attendance **Family**: Family size, Father's occupation **School**: School quality
Roebuck et al. (2004)	Adolescents aged 12-18 years from the 1997 and 1998, nationally (NHSDA) N=15168	Probit model	School dropout	**Student**: Demographics, Health condition, Marijuana use, Other drug user **Family**: Family income
Roscigno & Crowley (2001)	8th graders nationally from 1998 (NELS & CCD)	HLM	High school dropout	**Family**: Family income, Parental education, Family structure, Family size, Parental expectations **School**: Composition, Expenditure per pupil, Resources
Rumberger (1983)	18-21 years old respondents not enrolled in high school nationally (NLSY79)	Probit regression	High school dropout	**Student**: Demographics, Attitudes, Behaviors **Family**: Parental education, Family income, Family structure, Parental employment, Family size **Community**: Unemployment rates
Rumberger (1995)	8th graders nationally from 1988 (NELS) N= 17,424 J= 981	HLM	Dropouts 8-10	**Student**: Demographics, Behaviors, Achievement, Academic background **Family**: SES, Family structure, Parenting practices, Parental expectations **School**: Composition, Resources, School size & location, Academic climate & Disciplinary climate, School organization, Peers

Citation	Sample	Method	Outcome	Predictors
Rumberger & Larson (1998)	8-12th grade students from 1988 to 1992 nationally (NELS) N= 11,671	Multinomial logistic regression	Dropouts 8-12/ Non-completion of high school	**Student**: Demographics, Attitudes, Behaviors, Achievement, Academic background/ Family: SES, family structure, Residential mobility/ **School**: School location, School type, Academic climate, Disciplinary climate, Teaching quality
Rumberger & Palardy (2005)	10th graders nationally form 1990 (NELS) N= 14,199 J= 912	HLM	Dropouts 10-12	**Student**: Demographics, Attitudes, Behaviors, Achievement, Academic background/ Family: SES, family structure, Residential mobility, Parenting practices **School**: Resources, Size, School location, Academic climate, Disciplinary climate, Teaching quality
Rumberger & Thomas (2000)	10th graders nationally from 1990 (NELS, HSES) N= 7,642 J= 247	HLM	Dropouts 10-12	**Student**: Demographics, Behaviors, Academic background **Family**: SES, family structure, Sibling dropped out **School**: Composition, Resources, School size, Location, School type, Academic climate, Disciplinary climate, Teaching quality
Rylance (1997)	18-27 years old who had a primary disability label of SED (NLTS) N=664	Hierarchical regression	High school dropout	**Student**: Demographic **Family**: Parental education, Family income **School**: Vocational education, Counseling/ Therapy
Sandefur et al. (1992)	Individuals who were aged 14 to 17 in 1979 (NLSY79) N= 5,246	Probit regression	High school completion	**Student**: Demographics, Attitudes **Family**: Parental education, Family structure, Family change, Family size, Family income

Citation	Sample	Method	Outcome	Predictors
Sander (1997)	10^{th} graders from the public schools and the Catholic schools in the rural sector	Nonlinear probit regression	High school graduation	**Student**: Demographics **Family**: Parental education, Family income **School**: School type
Sander (2001)	High school students in Chicago & Illinois public school system	Ordinary least squares regression	High school dropout rate	**School**: Composition, Size, Mobility rate **District**: compositions, Expenditure per pupil
Sander & Krautmann (1995)	10th graders/ 12th graders Nationally from 1980 (HSB)	Probit regression	10-12 dropouts	**Student**: Demographics **Family**: Parental education, Family income **School**: School type
Smokowski et al. (2004)	Disadvantaged minority children in Chicago (93% African American, 7% Latino or Other) (CLS) N= 1,539 J= 25 Neighborhood areas= 17	Logistic regression	High school completion	**Student**: Demographics, Academic background, Achievement, Behaviors **Family**: Family structure, Family size, Parental employment, Poverty, Parental education, Parenting practices
South et al. (2003)	Young women and men aged 12 to 22 nationally, (NSC, 1980 U.S. Census) N= 1,128	Logistic regression	High school dropout High school graduation	**Student**: Demographics, Attitudes, Behaviors **Family**: Family income, Parental education, Family size, Parenting practices **Community**: Neighborhood SES, Neighborhood disadvantages index
South et al. (2007)	7-12 grade students from 1994-95 7-11 grade students from1996, nationally (Add Health)	Multilevel logistic regression	School dropouts	**Student**: Demographics, Achievement, Attitudes, Behaviors **Family**: Parent-child relationship, Social capital, Parent civic participation, Parental education, Family structure **School**: School level mobility

Citation	Sample	Method	Outcome	Predictors
Stearns et al. (2007)	8-12 graders nationally in 1990 (NELS)	Logistic regression	Early dropout/ late dropout	**Student**: Demographics, Academic background, Attitudes, Behaviors **Family**: SES, Family structure **School:** Relationship with teachers
Stevenson et al. (1998)	13-18 years old Caucasian and African-American pregnant adolescents in Baltimore (BSS) N (Caucasian)=51 N (African-American)=68	Logistic regression	High school dropout	**Student**: Demographics, Attitudes, Behaviors, Psychological well-being, Social support **Family**: SES
Stone (2006)	8th graders nationally in 1988 (NELS) N= 2174 J= 174	HLM	Dropout of school after 10th grade	**Student**: Demographics, Behaviors, Academic background, Achievement **Family**: SES, Family structure, Family size, Parental employment, Parental expectations, Parental education, Family stress, Sibling dropout, Parenting practices **School**: Composition, School size

Citation	Sample	Method	Outcome	Predictors
Suh et al. (2007)	Youth who either graduated from high school (completers) or who had not enrolled in high school (dropouts) in 2000 nationally (NLSY97) N=4,327	Logistic regression Analysis	High school dropout	**Student**: Demographics, Achievement, Behaviors, **Family**: SES, Family size, Mothers' education, Family structure **School:** Social support, Peers
Swanson & Schneider (1999)	8th graders/ 1990 10th graders Nationally from 1988 (NELS) N= 16,489	Logistic regression	Dropouts 8-10/ Dropouts 10-12	**Student**: Demographics, Behaviors, Achievement, Academic background **Family**: Family income, Parental education, Family structure, Parenting practices, Parental expectations, Family change **School**: School location
Sweeten (2006)	Youths who were below age 12-17 in high school, nationally (NLSY97) N=2501	Logistic regression	High school graduation	**Student**: Demographics, Achievement, Behaviors, Academic background **Family**: Poverty level, Family structure
Tanner et al. (1999)	14-22 aged youths nationally in 1979 (NLSY79) N=6,111	Bivariate regression		**Student**: Demographics, Behaviors, Attitudes, Delinquency **Family**: SES, Family structure, Family size
Teachman et al. (1996)	8th graders nationally from 1988 (NELS) N= 16,014	Logistic regression	8th-10^{th} dropouts	**Student**: Demographics, Academic background **Family**: Parenting practices, Family structure, Family change, Family income, Parental education, Family size, Sibling dropped out **School**: School type
Teachman et al. (1997)	8^{th} grade nationally from 1988 (NELS)	Logistic regression	10-12 dropout	**Student**: Academic background **Family**: Family structure, Parenting practices, Family income, Parental education, Sibling dropped out, Family size **School**: School type

Citation	Sample	Method	Outcome	Predictors
Temple et al. (2000)	Minority children from high-poverty neighborhoods who entered kindergartens in 1985 (CLS) N=1500	Probit regression	High school dropout	**Student**: Demographics, Academic background **Family**: Low income, Parental education, Parenting practices
Upchurch & McCarthy (1990)	14-21 aged U.S. men and women in 1979 (NLSY79)	Event history analysis	High school completion	**Student**: Demographics, Time to birth, Behaviors **Family**: Parental education, Family structure, Family size, Mother's employment
Van Dorn et al. (2006)	8th graders nationally (NELS) N=4,079	Hierarchical logistic analysis	Dropout	**Student**: Demographics, Achievement **Family**: Baseline risk **School**: School size, School GPA, School risk **Community**: Local diversity, Inequality
Vegas et al. (2001)	10th graders nationally from 1980 (HSB) N= 10,584	Logistic regression	10-12 graduation	**Student**: Demographics, Achievement
Velez (1989)	10th graders nationally from 1980 (HSB) N= 4,170 (non-Hispanic white) N= 1,116 (Chicanos) N= 195 (Cubans) N= 192 (Puerto Rican)	Logistic regression	10-12 dropouts	**Student**: Demographics, Attitudes, Behaviors, Achievement, Academic background **Family**: SES, Family structure, mother's educational expectations
Ward (1995)	Indian students attending three high schools on or near Northern Cheyenne reservation in 1987-1989	Logistic regression	High school gradation status	**Student**: Demographics, Behaviors, Academic background, Achievement **Family**: Family structure **School**: School type

Citation	Sample	Method	Outcome	Predictors
Warren & Cataldi (2006)	High school sophomores and/or seniors N= 1,075 (NLS) 922 (NLSY79) 23,859 (HSB) 13,082 (NELS) 931 (NLSY97)	Logistic regression	10-12th dropouts	**Student**: Demographics, Attitude, Behaviors, Employment status, Hours worked per week, **Family**: Parents' education, Family structure
Warren & Edwards (2005)	8th grade U.S. students, nationally (NELS) N= 13,632 J= 996 S= 50	HLM	High school graduation	**Student**: Demographics, Achievement **Family**: SES **School**: Composition, School type **State**: Composition, Units required for graduation, GED pass criteria, Mean teacher salary, teacher quality (%)
Warren & Jenkins (2005)	9th-12th graders in Florida and Texas from the 1968-2000 (CPS)	Nonlinear hierarchical model	High school dropout	**Student**: Demographics **Family**: SES, Family income, Family structure, Household head' education, Head's occupation, Head's employment, Head's age **State:** State exit examination requirement
Warren et al. (2006)	50 states and the District of Columbia by the 28 years from 1975 through 2002	Fixed effects models	State-level high school dropout & completion	**State:** Compositions, Per-pupil expenditures, pupil-teacher ratios in secondary schools, Carnegie units required for graduation, Compulsory age of school attendance, High school exit examination
Warren & Lee (2003)	10th graders nationally from 1990 (NELS) N= 14,787 J= 99(markets)	HLM	Dropouts 10-12	**Student**: Demographics, Attitudes, Behaviors, Achievement, Academic background **Family**: SES **Community**: Affluence

Citation	Sample	Method	Outcome	Predictors
Wehlage & Rutter (1986)	10th graders nationally from 1980 (HSB)	Discriminant function analysis	10-12 droupouts	**Student**: Demographics, Attitudes, Behaviors, Achievement, Academic background **Family** SES
White & Kaufman (1997)	10th graders nationally from 1980 (HSB)	Hierarchical logistic regression	10-12 dropouts	**Student**: Demographics, Attitudes, Achievement, Academic background **Family**: SES
Wilson (2000)	Individuals in the PSID who were between the ages of 0 and 6 in 1968 (PSID, 1970 and 1980 U.S. Census, CCD) N= 1,772	Probit regression	High school graduation	**Student**: Demographics **Family**: Parental education, Family income, Siblings **School**: Student-teacher ratio **Community**: Composition
Wilson (2001)	Individuals in the PSID who were between the ages of 0 and 6 in 1968 (PSID, 1970 and 1980 U.S. Census, CCD) N= 1,772	Probit regression	School completion	**Student**: Demographics **Family**: Parental education, Family income, Family size **School**: Student/teacher ratio **Community**: Composition
Wilson et al. (2005)	Aged 0-6 years children nationally from 1968 to 1993 (PSID) N= 1,942	Probit regression	High school graduation decision	**Student**: Demographics **Family**: Parental education, Family structure, Mother works, Family poverty, Residential mobility
Wojtkiewicz (1993)	Men and women age 12 through 21, nationally (NLSY) N=8,381	Logistic regression	School completion	**Student**: Demographics **Family**: Family income, Parental structure, Parental education, Family size, family size **Community**: Composition

Citation	Sample	Method	Outcome	Predictors
Wojtkiewicz (1993)	Respondents aged 19 and over nationally (NSFH) N= 9,997	Logistic regression	High school graduation	**Student**: Demographics **Family**: Family structure, Parental education, Family size, Public assistance
Wojtkiewicz & Donato (1995)	Respondents between 14 and 21 years old in 1979, nationally (NLSY79) N= 8,894	Logistic regression	High school graduation	**Student**: Demographics **Family**: Family structure, Siblings, Parental education
Worrell & Hale (2001)	at-risk students attending a continuation high school in a small urban school district in the San Francisco Bay area N= 97	MANOVA	School dropout	**Student**: Behaviors, Attitudes, Academic background, Achievement
Yamada et al. (1996)	High school students who were in the 12^{th} grade during the 1981-82 (NLSY) N=672	Probit regression	High school graduation	**Student**: Demographics, Drug use, Achievement **Family**: Family structure, Siblings, Parental education, Poverty line
Yin & Moore (2004)	1988 9th graders nationally (NELS) N= 1,883-2,164	Chi-square tests	School dropouts	**Student**: Interscholastic sport participation
Zhan & Sherraden (2003)	12-18 years old residing in female-headed households in between 1992 and 1995, nationally (NSFH)	Logistic regression	High school graduation	**Student**: Age, Gender **Family**: Mother's demographics, Mother's educational status, Mother's employment status, Household income, family size, Mother's assets **Community**: County poverty rate
Zimmerman & Schmeelk-Cone (2003)	African American adolescents from the four public high schools in a large Midwestern city N= 681	SEM	School completion	**Student**: Drug/Alcohol use, School motivation

Citation	Sample	Method	Outcome	Predictors
Zsembik & Llanes (1996)	Mexican descent aged 25 and older, nationally, LPSID (Latino sample of the Panel Study of Income Dynamics)	Logistic regression	School completion	**Student**: Demographics, Academic achievement **Family**: Parental education