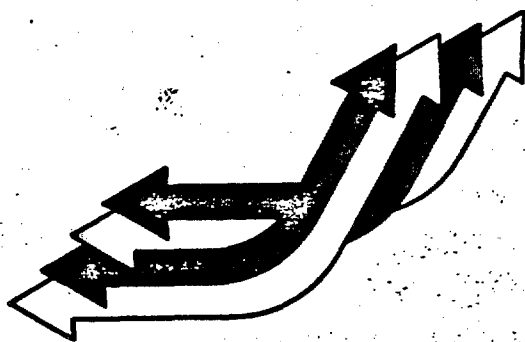# Contractor Report

Who Drops Out of High School?

Findings from High School and Beyond

Center for Education Statistics

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Preface

The analyses presented in this report were funded by the Center for Education Statistics in Fiscal Year 1983. For a variety of reasons, this project required more time to complete than was originally planned. Subsequent analysis of dropout issues, using later High School and Beyond data, will hopefully extend the limited findings in this report.

As part of the peer review process of the Center for Education Statistics and the Office of Educational Research and Improvement, several individuals commented upon this report. Specifically, this report was reviewed by Phillip Kaufman, Steven Kaufman, and Charles Cowan of the Center for Education Statistics (USED), Valena Plisko of the Office of Planning, Budget and Evaluation (USED), and James Stedman of the Congressional Research Service.

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I. INTRODUCTION

This is the final report on a study of factors associated with dropping out of high school, conducted cooperatively by SMB Economic Research, Inc. and the Center for Education Statistics, U.S. Department of Education (formerly the National Center for Education Statistics). In this study, we examine the influences of personal and family background, attributes, economic and locational factors, school characteristics and educational experiences, and certain student behaviors and choices on the decision to leave high school before graduation. We also give special attention to intergroup differences, attempting to sort out the factors responsible for disparities between male and female and among white, black, and Hispanic dropout rates. These analyses, which employ both descriptive statistics and the multivariate event-history method, are based on data from the initial and first follow-up rounds of the High School and Beyond (HS&B) survey of the sophomore class of 1980.

BACKGROUND: THE DROPOUT PROBLEM

The work reported on here, together with other recent research on the subject, coincides with a new round of professional and policy interest in "the dropout problem." That problem last attained salience in the policy arena during the 1960s, when many dropout prevention efforts were launched. It subsequently receded into the background, only to return to prominence under altered circumstances during the last few years. Today, there is concern that nongraduation rates, already unacceptably high, may increase further because of (a) increases in the proportion of school enrollment made up of poor and minority students, the groups most at risk of not completing school, (b) concern for special programs aimed at meeting the needs of these at-risk students, and (c) current reform efforts aimed at raising educational standards and graduation requirements, which, albeit inadvertently, may induce more low-performing students to drop out. The last of these reasons for concern is significant because, seemingly for the first time, it brings dropouts into the center of the debate over the quality of American schools. This report is focused on the high school dropout problem and a majority of the analyses are focused on the public high school dropout problem.

Why is dropping out a problem? As the research literature amply documents, there are serious adverse consequences both for the individuals concerned and for society from failure to complete high school. The private costs likely to be borne by nongraduates include impaired access to most of the preferred occupational categories in the economy, reduced earnings and income, greater risk of unemployment, and consequent diminution of many ingredients, both tangible and intangible, of the quality of life. The putative social costs include reduced economic output and the consequent loss of public revenue, increased demand for public transfer payments, and probable increases in crime and other forms of antisocial behavior. Moreover, the adverse effects of dropping out may be passed down through the generations, as dropouts are less likely than high school graduates to provide favorable economic and educational opportunities to their children.

The strongest evidence on the harm done by dropping out pertains to the economic consequences for the dropouts themselves. That dropouts earn less than nondropouts, are more frequently unemployed, and are more likely to be found in lower-level occupations is documented in regularly published reports of the Bureau of Labor Statistics (e.g., Young, 1982). Similar evidence, derived from Census data and including comparisons of both annual and lifetime earnings, is presented in the Digest of Education Statistics (Grant and Snyder, 1983). These data further demonstrate that the relative position of dropouts has been getting worse. The earnings of male dropouts were considerably lower relative to earnings of male high school graduates in 1981 than in 1971, and the 1971 ratios, in turn, were lower than those of the previous decade. Rumberger (1983) reinforces these findings

with 1979 salary and unemployment-rate comparisons between dropouts and high school graduates. Hill and Stafford (1977) and King (1978) provide further corroboration for earlier years, including demonstrations of the lower earnings and higher unemployment rates experienced by dropouts.

Of course, evidence that dropouts fare worse economically than high school graduates does not establish, by itself, that dropping out is an independent cause of low economic performance. It has been argued that the lower economic achievement of dropouts is attributable mainly to the same background factors as led the dropouts to leave school--that is, dropping out is less a cause of poor performance than a "symptom" of prior disadvantages (Bachman, Green, and Wirtanen, 1971). However, the preponderance of the evidence seems to support the conventional wisdom that dropping out per se makes a difference. Both the human capital rate-of-return literature and the sociological status-attainment literature confirm that earnings and other economic outcomes depend on years of schooling, even after controlling for family background, ability, and other factors (see, e.g., Jencks, 1979)[1]. Controlling for family background does reduce the earnings differential between dropouts and nondropouts, but according to Olneck (1979), half the original earnings gap remains. Moreover, as pointed out by Pallas (1984), most studies compare dropouts only with high school graduates who have not gone on to college, thereby omitting the contribution that high school graduation makes to earnings by providing the "ticket" to postsecondary education.

Going beyond the disadvantages suffered by the dropouts themselves, it has been shown that nongraduation entails social costs. According to Levin (1972), persons who fail to complete high school are more likely to require public assistance. In addition, the loss of taxable output and income attendant on their dropping out constitutes a drain on the public treasury. Elliott and Voss (1974) and Ehrlich (1975), along with Levin (1972), have shown that dropping out is associated with crime and delinquency. The Carnegie Council (1979) notes possible connections to drugs, sexual activity, unemployment, and an array of other behaviors. Although these linkages are less firmly established than those to earnings and employment, they do suggest that dropping out is more than a private matter. The community as well as the individual is at risk, and there is reason for the community to be concerned.

INFLUENCES ON DROPPING OUT

To translate concern into effective action requires knowledge of the causes or antecedents of dropping out. Considerable knowledge has accumulated over the years about certain influences on dropping out, but major information gaps remain. We comment here, first, on what is known about the effects of particular sets of variables on dropping out and, second, on the analytical approaches used in a few of the more important recent studies.

The factors most strongly and consistently linked to the incidence of dropping out are indicators of family socioeconomic status (SES) and other aspects of family background. The importance of these factors in determining educational attainment is thoroughly established in both the sociological status attainment literature and the economic literature on demand for education. If such background factors help to determine overall years of schooling completed (e.g., Jencks, 1979) and influence the demand for higher education (e.g., Manski and Wise, 1983), it is reasonable to believe that they influence high school continuation decisions as well.

Direct evidence on the effects of family background on dropping out is provided in such studies as Combs and Cooley (1968), Nam, Rhodes, and Herriott (1968), Bachman, Green, and Wirtanen (1971), Hill (1979), Mare (1980), and Rumberger (1983), all of which demonstrate that the frequency of dropping out declines with rising SES. In addition, Mare (1980) and Rumberger (1983) show that dropout rates are higher among students from larger families and broken homes. More generally, Mare (1980) shows that the influence of SES and family structure, while significant at all stages of education, is more so for earlier

than for later education transitions, which implies that such factors should be even more important in influencing high school completion than they have been shown to be in influencing postsecondary education decisions.

Differences in dropout rates between the sexes and among racial and ethnic groups are well documented in the literature (see, e.g., Grant and Snyder, 1983; Peng, Takai, and Fetters, 1983; and, with special reference to Hispanics and other language minorities, Steinberg, Blinde, and Chan, 1984). Portes and Wilson (1976) show that differences in educational attainment between whites and blacks tend to wash out when SES factors are controlled--in fact, holding SES constant, black attainment is higher than white. Along the same line, but with specific reference to dropping out, Rumberger (1983) has shown that interracial differences in dropout rates diminish when SES factors are taken into account, and Myers and Ellman (1983), using the HS&B data, have shown that, holding SES constant, the dropout rate for blacks is lower than that for whites. In addition, there are indications in both Hill (1979) and Rumberger (1983) of interracial differences in sensitivity of the dropout rate to SES and other explanatory factors.

The effects of location and local economic conditions on dropping out have received only occasional attention. Rumberger (1983) finds a significant regional difference--a higher dropout rate in the South than elsewhere, and additional regional effects are reported in Myers and Ellman (1983). Hill (1979) attempts to determine whether the "local demand for teenage labor" is an influence on dropping out, but his proxy for demand is unsatisfactory, and the results are inconclusive. An earlier study by Lerman (1972), based on Current Population Survey (CPS) data, reports some effects of metropolitan wage rates and unemployment rates on dropping out, but methodological problems raise questions about the validity of these results.

The effects of school factors have rarely been examined, not because their potential importance is unappreciated but mainly because of the lack of suitable data. Hill (1979) did include in his model a "school quality" index, constructed from data on staffing ratios, library resources, and teacher salaries, but no direct effect of that index on the dropout rate was found. No similar variables appear in the other models we have reviewed.

The effects of certain student behaviors and choices on the dropout rate have been demonstrated in multiple studies. Effects of marriage and childbearing are examined in Waite and Moore (1978), Marini (1978), and Howell and Frese (1982) as well as in Myers and Ellman (1983). Caution is indicated in assessing these relationships, however, because the direction of causation is unclear. The effect of working while in school is examined by D'Amico (1984), who finds that a large amount of work is associated with a higher rate of dropping out, while a moderate amount of work either has no effect on the dropout rate or actually reduces it. A number of studies, cited earlier, relate dropping out to delinquency, but once again the direction of causation is in question.

Of the aforementioned studies, those most relevant in shaping ours were Hill (1979), Rumberger (1983), and Myers and Ellman (1983)[2]. All three use microdata bases (observations of individual students) and employ multivariate estimation techniques to relate student characteristics and other factors to the probability of dropping out. Several earlier studies also offer dropout-rate models, but they either rely on aggregative data (Edwards, 1975) or apply ordinary least squares (OLS) regression methods to discrete-choice indicators of dropping out (Masters, 1969; Lerman, 1972), which is not a satisfactory statistical technique.

The study by Hill (1979) is based on 1966-68 data from the National Longitudinal Survey of Young Men (Parnes data). Its significance to this study arises mainly from the range of variables it includes. Among these, as already noted, are an index of local labor market conditions and an index of school quality. It also features an ability indicator, an indicator of retarded progress through school, and an index of student "knowledge of the labor market.". Also relevant to the present study is Hill's attempt to compare patterns of dropping out between race/ethnic groups, which, however, distinguishes only between whites and nonwhites and is restricted to males because of the limitations of his data base.

Rumberger's 1983 study is based on the National Longitudinal Study of Youth Labor Market Experience, which provides 1979 data for a sample of youth aged 14 to 21. His probit model relates the dropout rate to an array of SES and other family background variables plus locational factors, an ability proxy, and marriage and childbearing variables. The analysis is disaggregated by sex and race/ethnicity (white, black, Hispanic), allowing Rumberger to demonstrate (a) that differences in dropout rates for different race/ethnic groups are substantially reduced when SES and other family background factors are held constant, and (b) that the sensitivity of the dropout rate to SES factors varies by race/ ethnicity. These are relationships that we also examine in this study, using a different data base and a different estimation method.

Finally, the Myers and Ellman (1983) study offers a preliminary exploration of influences on dropping out, based on the same HS&B data as used in this study but with a more limited set of variables. These previous investigations plus, to a lesser extent, others mentioned above, influenced the selection of variables and the model specifications reflected in this report.

ORGANIZATION OF THIS REPORT

We have organized this report around substantive findings regarding influences on the dropout rate. Accordingly, the main body of the text, following a chapter on the data and methodology, consists of a series of chapters dealing with particular sets of variables. Each such chapter presents both (a) descriptive statistics on the dropout rates associated with different values of the variables in question and (b) estimates from multivariate models of net effects of the variables on the probability of dropping out.

Chapter II describes the data base and methodology. It summarizes the characteristics of the HS&B base-year and first follow-up data files, the HS&B transcripts data, and special files of geographically coded economic data that we added to the HS&B data set. It explains how we defined "dropout" for the purposes of the descriptive and multivariate analyses and it reports major characteristics of the samples of students on which our results are based. It then outlines our statistical methods, with special emphasis on the event-history methodology used in the multivariate analysis.

Chapter III deals with overall dropout rates and variations by race/ethnicity and sex. In it, we show how estimates of overall rates depend on the definition of "dropout," and we explain the effects on those estimates of limitations of the HS&B data set (of which the most important is the lack of information on students who drop out before the latter half of the sophomore year). We present interrace/ethnicity and intersex comparisons of both gross, or unadjusted, dropout rates and estimated net rates with personal characteristics controlled. Finally, we examine differences between the HS&B dropout rates and those obtained from other recent studies.

Chapters IV through VII all deal with particular sets of influences on the dropout rate. Chapter IV covers socioeconomic and other family background factors; Chapter V deals with locational and economic factors; Chapter VI examines school factors and educational experiences; and Chapter VII considers certain student behaviors and choices. Each such chapter, as already noted, presents both the descriptive statistics and the results from multivariate models pertinent to the variables in question. Each presents separate results for the six race/ethnicity-sex groups defined by classifying students as male or female and as white, black, or Hispanic as well as results for all groups combined, and each offers observations on intergroup differences in patterns of dropping out.

Footnotes:

1. Whether there is a high school graduation effect on earnings and other economic outcomes over and above the effect of completing the 12th year of schooling (i.e., a "credential effect" of the high school diploma) is a separate and more difficult issue to resolve.

2. An even more closely related study, based on the HS&B data base, is Pallas (1984), but that analysis did not become available to us until after our own empirical work had been completed.

II. DATA AND METHODOLOGY

To set the stage for the subsequent analysis of influences on dropping out, we discuss in this chapter the data and methodology on which our findings are based. Specifically, we describe the High School and Beyond data base and the other data bases used in the study, explain how we define "dropout" and "dropping out," and outline the statistical methods used to analyze influences on dropping out.

THE DATA BASE

The main data sources for this study are the baseline and first follow-up High School and Beyond (HS&B) surveys of high school students who were sophomores in 1980. Relevant data items have been extracted from both the individual student questionnaire and the school questionnaire of each round of the survey. In addition, we have supplemented the basic HS&B data with information from two other sources. One is the High School and Beyond Transcripts File, which provides data extracted from the high school transcripts of a subset of students in the HS&B sample. The other is a specially constructed set of economic data, derived from files prepared by the Bureau of Labor Statistics (BLS) and the U.S. Department of Commerce Bureau of Economic Analysis (BEA), pertaining to the counties, metropolitan areas, and states in which HS&B sample students attended high school. The key characteristics of each data base are summarized below.

High School and Beyond Survey Data and Samples

The HS&B baseline and first follow-up surveys were conducted in the spring of 1980 and spring of 1982, respectively. In each round of the survey, data were collected on two cohorts: members of the high school sophomore and senior classes of 1980. This study makes use of the data on the sophomore cohort. That is, it depends on data obtained from a sample of high school sophomores in 1980 and on additional data obtained from the same students two years later, when they would normally have been completing their senior years.

Survey Content and Methods. The HS&B survey data pertaining to individual students were obtained mainly from student-completed questionnaires--which is to say, they are self-reported data. In addition, the data include students' scores on a special battery of aptitude and achievement tests. Apart from the test scores, the major data categories include personal and family background, educational experiences and accomplishments, behavior in the school setting, certain aspects of behavior outside the school, educational expectations and aspirations, and personal attitudes and opinions. Some items appear in both the base-year and follow-up surveys, allowing for consistency checking and examination of changes over time. In the follow-up round, however, different questionnaires were administered to students still enrolled in their original schools and to students no longer so enrolled, including dropouts. This sometimes prevents us from comparing responses of dropouts and nondropouts to the same questions. All questions, the questionnaires themselves, and descriptions of the test batteries are presented in the National Opinion Research Center Data File User's Manual on the 1980 sophomore cohort (Jones et al., 1983).

The working data set assembled for this study consists of selected items drawn primarily from the following categories: personal and family background characteristics (e.g., race/ethnicity, sex, age, religion, family composition, parents' education and occupation), school experiences and accomplishments (e.g., program in which enrolled, test scores, grades, whether held back), and student behaviors and choices (e.g., working while in school, getting married or having a child, and having disciplinary problems or trouble with the law). The selection of items was based partly on findings from earlier studies,

partly on theoretical arguments, and partly on interests of policymakers in the relationships of particular variables to rates of dropping out.

Data from the individual student questionnaires have been supplemented by data from HS&B school questionnaires, completed by building principals or their designees. The school-level data incorporated into our working data set included items on school size, resources (e.g., teacher/pupil ratio), program offerings, and composition of the student body.

The HS&B Sample. Several characteristics of the HS&B sample had a direct bearing on the design of this study. Among the key factors, of course, are the size and composition of the sample. In addition, certain aspects of the sampling plan are relevant, especially in interpreting the results. Only a few aspects of HS&B sampling are touched on here. A complete summary appears in Jones et al. (1983), and a detailed discussion of the sampling plan is provided in Frankel et al. (1981).

The HS&B sampling plan is based on a two-stage design, in which a sample of high schools is drawn at the first stage and samples of students within each sample school are drawn at the second stage. Schools were selected according to a stratified proportional sampling procedure, allowing for differential sampling rates to ensure coverage of special-interest categories of schools. Random samples of 36 sophomores and 36 seniors (or as many as available, if fewer than 36) were then drawn from each school. The resulting baseline sophomore-cohort sample consisted of 30,030 students attending 1,015 high schools. In the 1982 follow-up round, all members of the 1980 sophomore cohort found to be still enrolled in their base-year high schools were selected with certainty for inclusion in the follow-up sample. Cohort members no longer attending their original schools, including early graduates and students transferring to other schools as well as dropouts, were subsampled at varying rates (Jones et al., 1983).

Information on the size of the "realized" sample (the number of students from whom data were actually obtained, as opposed to the number drawn) is provided in Table 2.1. This table shows the number of 1980 sophomores from whom data were obtained in each round of the HS&B survey and the number from whom data were obtained in both rounds. In addition, it shows the numbers of students within each category who were classified as dropouts for the purpose of administering the follow-up survey. The descriptive analyses in this report pertain to the 25,875 students from whom data were collected in both the baseline and follow-up rounds—a group referred to as the "panel sample" to indicate that findings are based on two sets of observations of the same panel of students. Moreover, for the purposes of this report, we are concerned primarily with public school students in the panel sample, of whom there are 22,551.

The numbers of students and dropouts shown in Table 2.1 are unweighted, which means that they are not usable directly for computing dropout rates. Appropriate weighting factors must be applied to adjust for the different sampling rates and response rates characteristic of different types of high schools and students. Each of the 25,875 students in the panel sample represents, on average, 146 high school sophomores in the nation; however, the weights applicable to particular sample students range from a minimum of 1.62 to a maximum of 2,163 (Jones et al., 1983). All dropout rates presented in this report are weighted estimates. For example, although the overall dropout rate for the panel sample would appear, from the last line in Table 2.1, to be 8.3 percent (2,148/25,875), the correct dropout-rate estimate, taking sample case weights into account, is 14.4 percent.

The size of the panel sample may seem ample for analytical purposes until one considers the degree of disaggregation required to respond to questions about patterns of dropping out. In comparing dropout rates among categories of students, it is the size of the subsamples rather than the size of the total sample that counts. To illustrate, Table 2.2 shows that some of the subsamples created by classifying students by race/ethnicity and sex are relatively small. Moreover, when one undertakes an analysis that requires cross-classification of students by multiple attributes—e.g., an analysis of the degree to which dropout rates vary within particular race/ethnic and sex categories according to,

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say, father's educational level--some of the subcategories involved in the comparison become very small. To illustrate, only 124 black females and 158 Hispanic females in the panel sample have fathers whose educational attainment is "college graduate or above," which makes it impossible to carry out a cross-tabular analysis by both race/ethnicity and sex and father's educational level without encountering unacceptably high standard errors of the estimated dropout rates.

Table 2.1

NUMBERS OF 1980 SOPHOMORES IN THE HS&B SAMPLES AND NUMBERS CLASSIFIED AS DROPOUTS

Round(s) in Which Data Obtained	Number of Students from Whom Data Obtained	Number Classified as Dropouts
Baseline	27,118	2,421
Follow-up	28,119	2,289
Both baseline and follow-up	25,875	2,148

Table 2.2

NUMBER OF STUDENTS IN PANEL SAMPLE, BY SEX AND RACE/ETHNICITY

Category of Students	Number of Students in Sample
White females	7,669
White males	7,313
Black females	1,609
Black males	1,339
Hispanic females	1,922
Hispanic males	2,093

Timing of the Surveys. The timing of the baseline and follow-up surveys is of critical importance to this study. Because questionnaires were administered to members of the 1980 sophomore cohort during the spring of their sophomore year (specifically between February and May), HS&B yields no information on students who would have been in the sophomore class of 1980 had they not dropped out prior to that time. It appears that the number of such early dropouts may be substantial (see the discussion of of dropout-rate data from other sources in Chapter III). Hence, our inability to cover these early dropouts is one of the most serious limitations of this study.

In addition, because the follow-up survey was conducted in the spring (February through June) of 1982, it missed some dropping out that took place during the latter part of the 1981-82 school year. This is a less serious problem than the omission of early dropouts because (a) the number of students who drop out late in their senior year is small, (b) some information on late dropouts is available from the HS&B transcripts file,

which is described below, and (c) it will eventually be possible to use data from the second HS&B follow-up survey (conducted in spring 1984), to bring the late dropouts into the analysis.

The HS&B Transcripts File

High school transcripts were collected during the fall of 1982 for a stratified sub-sample of the original 1980 sample of sophomores. Transcript data were obtained for 15,941 members of the panel sample, of whom 12,695 were public school students. Dropouts, however, were among a number of "policy relevant subgroups" included in the transcript sample with certainty, so transcripts are available for a large percentage (1,855 out of 2,148 dropouts in the panel sample, or 86 percent).

The transcripts file contains information on students' educational experiences that is not available from the HS&B student questionnaires. The available items include each student's absenteeism and suspension record, participation in certain specialized programs, various test scores (unfortunately mostly for college-bound students), grade-point average and rank in class, and detailed data on courses taken and credits and grades earned. Of greatest relevance to the dropout analysis, however, are certain items useful for confirming dropout status, establishing the timing of dropping out, identifying students who dropped out after the date of the follow-up survey, and implementing alternative dropout definitions. These include the month and date that each student left school and the "official" reason for leaving (e.g., graduated, transferred, dropped out). In addition, one can make inferences about when students left school from transcript information on when they enrolled in and completed specific courses (see the section on "Definitions of Dropouts," below).

Geographically Coded Economic Data

One important limitation of the HS&B data set for the purpose of a dropout study is that it contains no information on economic factors, such as unemployment and wage rates, that might influence students' decisions to drop out. To fill this gap, we created a special file of geographically coded economic data and merged it with the HS&B data base (Kolstad, 1984). This special file includes data on per capita personal income, obtained from the Bureau of Economic Analysis (BEA), U.S. Department of Commerce, and data on unemployment rates, manufacturing wage rates, and rates of employment growth, obtained from the U.S. Bureau of Labor Statistics. All these variables are disaggregated by state, county, and standard metropolitan statistical area (SMSA). Using HS&B information on the locations of the high schools that students attended in 1980, we were able to merge these data with the HS&B survey files. Thus, we have been able to associate with each student information on the aforementioned four economic variables for the county, SMSA, and state in which that student attended school.

DEFINITIONS OF DROPOUTS

All the analyses carried out in this study hinge on a distinction between dropouts and nondropouts, but deciding who is a dropout is less straightforward than it may seem. There is, first, a conceptual distinction between dropping out as an event and being a dropout as a characteristic of an individual at a particular time. These concepts correspond, respectively, to what may be termed gross and net definitions of "dropout." According to the gross, or dropping-out-as-an-event, definition, any student who committed the act of dropping out--i.e., left school without graduating and stayed away for at least some specified minimum time--is counted as a dropout, regardless of whether he or she later returned to school or completed a high school equivalency program. The dropout

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rate, according to this definition, is the percentage of students who temporarily or permanently stopped their schooling before graduation. In contrast, according to the net dropout, or dropping-out-as-a-condition, definition, an individual is a dropout at a particular time if he or she is not then enrolled in school and has not yet graduated or completed a high school equivalency program. By this definition, being a dropout is a state or condition but not an irreversible attribute. One may be a dropout now but cease being a dropout tomorrow by returning to school or completing an equivalency program. The latter definition allows no final answer to the question of how many students dropped out of the sophomore cohort of 1980. The answer is time dependent. The rate could have been, say, 20 percent as of the cohort's normal graduation date but could then have fallen to only, say, 15 percent two years later, as some of the initial nongraduates returned to or completed school.

Both definitions are encountered in discussions of the public high school dropout problem. On one hand, recent public statements that the national dropout rate is around 27 percent reflect a gross definition[1]. This figure is based on the finding that only 73 percent of the students who begin high school in a given year graduate four years later, and consequently it neglects the students who graduate late or earn GEDs. On the other hand, the Census Bureau's estimate that only 12.3 percent of 14 to 34 year-olds were dropouts in 1983 (cited in Grant and Snyder, 1986) clearly reflects the net dropout definition. That is, only 12.3 percent of those surveyed reported neither having graduated nor being enrolled in school at the time of the survey. Naturally, using a gross rather than a net definition yields substantially higher dropout-rate figures.

The HS&B data lend themselves most readily to implementation of a particular variant of the net, or dropping-out-as-a-condition, definition. Specifically, Jones et al., in classifying respondents for purposes of follow-up survey administration, have identified as dropouts individuals who fit the following specification:

> A dropout is a person who was a high school sopho-
> more in spring 1980 but who was neither enrolled in
> high school nor a high school graduate or the
> equivalent at the time of the follow-up survey in
> spring 1982.

This definition, which we term the HS&B "student classifier" definition, is the one we have applied to members of the panel sample and adhered to through most of the descriptive statistical work.

We considered modifying the foregoing definition by eliminating from the dropout category those students who claimed to have completed high school equivalency programs or GEDs by the time of the first follow-up survey. The students in question are those who responded to the follow-up questionnaire item,

> Do you plan to go back to school eventually to get
> a diploma or to take a high school equivalency test
> or GED? (Question 16, Dropout Questionnaire),

by selecting the answer, "No, already have GED or equivalent." Taking such responses at face value would have reduced the estimated dropout count by about 10 percent. We are skeptical of the validity of these responses. To have completed a GED by spring 1982 is to have done so in less time than would have been required to graduate from regular high school. In addition, the GED may not be equivalent to a high school diploma. Accordingly, we chose not to work with the modified definition. Nevertheless, some of the responses may be valid, and to that extent the student classifier definition overstates the net attrition rate between the baseline and follow-up surveys[2].

As an experiment with a gross dropout definition, we attempted to identify and add to the dropout category students who appeared to have left school temporarily and then returned. To identify such students, we relied on the following HS&B first follow-up survey item (Question 17, First Follow-up Questionnaire):

> What is the longest time you ever stayed away from
> school when you weren't ill--(not counting school
> holidays or vacations)
>> Less than one week
>> 1 or 2 weeks
>> 3 weeks
>> 4 weeks to 8 weeks
>> Entire quarter or semester
>> School year or longer

Students who selected either of the last two responses were classified as temporary dropouts ("stopouts"), and the number of such students was added to the number of net dropouts to produce a gross dropout estimate. However, since this procedure increased the number of identified dropouts only slightly (by about 0.9 percentage points), we concluded that there was too little difference between the gross and net concepts, insofar as we could implement them, to justify a separate analysis based on the gross definition.

For the multivariate event-history analysis, the dropping-out-as-an event is the natural and appropriate dropout concept. (The event-history method, as explained below, deals with transitions between one state and another--as, e.g., between enrolled student and dropout.) Moreover, the event-history method requires data on the time at which each student left school. To generate school leaving and timing data corresponding to the desired definition, we focused on the subset of the panel sample for which transcript data were available (the "transcript sample"). Using both HS&B questionnaire items and transcript items, we identified as dropouts students who fit any of the following specifications:

a. students identified as dropouts according to the HS&B student classifier definition given above;

b. students identified as late dropouts on the basis of transcript information showing departure from school prior to graduation but after the first follow-up survey;

c. students whose transcripts indicated gaps in enrollment of one semester or more; and

d. certain students classified as transfers for the purpose of HS&B survey administration but whose transcripts indicated a gap in enrollment of one semester or more.

Note that the students in categories (c) and (d) are "stopouts," or temporary dropouts, and that, in addition, category (a) includes additional stopouts who may have completed high school equivalency programs. Thus, the definition reflects a gross dropout concept. Note also that the inclusion of category (b) extends the time span of the analysis from the period of the first follow-up survey (February-June 1982) to the time of collection of transcript data (September 1982). Including the late dropouts increases the dropout count by about 9 percent. The other adjustments enumerated above (items c and d) have very minor effects.

STATISTICAL METHODS

As noted in the Introduction, two fundamentally different types of questions are asked about influences on dropping out, and two different types of statistical analysis are required to answer them. The more straightforward and frequently asked questions, which call for descriptive statistical answers, concern differences in dropout rates among categories of students or between students with and without particular attributes. Examples of such questions are

o What are the differences in dropout rates among whites, blacks, and Hispanics?

o How do dropout rates differ between students whose mothers do and do not work outside the home? and

o How does the dropout rate vary as a function of family socioeconomic status?

The less-frequently voiced, but more penetrating questions concern the net, or incremental, effects of specified variables on dropout rates, taking into account other factors also associated with the likelihood of dropping out. Such questions take the general form, "other things being equal, or holding other things constant, what is the effect of variable X on the dropout rate?" For example, holding constant such factors as family socioeconomic status and characteristics of the educational environment, how is the dropout rate affected by whether a student is white, black, or Hispanic or whether the student's mother works outside the home? The essential difference between the two kinds of inquiries is that the former call for gross comparisons, unadjusted for other factors, while the latter require net comparisons, in which the effects of factors other than the factor in question are "controlled for," or taken into account. Whereas the gross comparisons can be handled with straighforward descriptive statistics, the net comparisons require inferences based on multivariate statistical models of the determinants of dropping out. Because answers to both types of questions are of interest to policymakers and the public, we present both types of findings in this report.

Descriptive Statistics

The principal descriptive statistical method used in this report is cross-tabulation analysis, and the principal medium for presenting the results is the comparative dropout rate table, which shows the rates at which students in specified categories, or with specified characteristics, leave school. In each such comparison, we categorize students according to a particular factor, such as the type of high school program in which they are enrolled or the type of area (urban, suburban, or rural) in which they attend school. In addition, because of the large variations in dropout patterns between the sexes and among ethnic groups and the high degree of policy interest in these differences, we generally cross-classify students by both sex and race/ethnicity. Thus, for example, the table showing the relationship between "urbanicity" and dropping out is a matrix showing the dropout rates for white males, white females, black males, black females, and so forth in urban, suburban, and rural locations. Nothing more is required to produce these descriptive tables than standard cross-tabulation methods. Specifically, we have used the SAS crosstab procedures. However, two technical points are worth noting about the resulting crosstab tables.

First, because of the stratified HS&B sampling design and the unequal response rates by different types of schools and students, unweighted dropout rates are not meaningful. Appropriate weights must be used in all the calculations. In most cases, these are the panel weights, corresponding to the panel sample, as defined above. The basic properties of these weights are summarized in Jones et al. (1983).

Second, because of the small size of some subgroup samples, certain dropout rates have large standard errors. We have decided, as a general rule, not to present any rates for which the standard error is one-half as large or larger than the estimated dropout rate. Those cells of the cross-tabulation matrices for which standard errors exceed this limit are labeled accordingly, and the corresponding inability to make certain comparisons is noted in our findings.

Apart from the sample-size problem, which affects relatively few of the calculations, it is important to keep in mind the more fundamental limitation of these, or any, descriptive cross-tabulation analyses--namely, that they can deal only with one or two variables at a time and cannot control for the many other factors that also influence rates of dropping out. We can show, for instance, how dropout rates vary between students with more educated and less educated parents and between central cities and suburbs, but we cannot ascertain how much of the apparent central city-suburban difference is due to the difference in parents' education between suburbs and cities rather than to the city-suburban difference per se. Thus, there is always the danger of drawing from the descriptive analyses incorrect conclusions about which factor is "really" responsible for observed differences in dropout rates among groups.

Multivariate Statistics: The Event-History Model

To address the more difficult problem of net, or incremental, influences, we have conducted a multivariate analysis, using the event-history methodology, of the determinants of dropping out. The purpose of the multivariate analysis, as already explained, is to provide the means of controlling for other factors (and interactions among factors) while analyzing the marginal influence of each individual variable on the dropout rate. The choice of the event-history method as the particular approach to the multivariate analysis reflects three characteristics of the dropping out phenomenon and the HS&B data base, all of which point to the event-history method as an appropriate analytical tool:

First, dropping out is a discrete event. That is, the variable to be explained, whether a student did or did not drop out (or is or is not a dropout) is dichotomous. This implies that a discrete-choice model is required, as opposed to a model suitable for continuous dependent variables, such as multiple regression analysis[3].

Second, the HS&B survey data are "censored" as of the date of the follow-up survey (or as of the date of transcript data collection, in the case of the transcript sample). That is, we are unable to observe students after that date to determine whether either (a) students who had not yet dropped out did drop out subsequently, or (b) students classified as dropouts as of the survey date subsequently returned and thus ceased to qualify as dropouts under the net dropout definition. The event-history model is specifically designed for use with censored data and avoids the problems of estimation bias encountered in applying other discrete-choice models, such as logit, to such data.

Third, the HS&B data base provides information on the timing of dropping out, which can be exploited in the event-history framework but not with such standard discrete-choice models as logit or probit.

The event-history method is presented in full detail in Tuma and Hannan (1984), and a less technical introduction is provided in Kolstad (1982). The key points are that the method (a) makes use of data on the time at which each student left school as well as on the occurrence or nonoccurrence of dropping out, (b) expresses the instantaneous rate of dropping out at each point in time as a log-linear multivariate function of various factors, and (c) provides maximum-likelihood estimates of the relationship between the rate of dropping out and the explanatory variables. The estimated effects of different factors on the instantaneous rate of dropping out can be transformed into estimates of effects on the probability of dropping out, and it is in the latter form that we report findings in this paper.

More specifically, the event-history equations representing the effects of multiple factors on the rate of dropping out take the form,

$$r(x_1, x_2, ..., x_n) = e^{(a_1 x_1 + a_2 x_2 + ... + a_n x_n)},$$

where r is the time rate of dropping out (i.e., fraction of remaining enrollees dropping out per month), the x's are influences on dropping out, and the a's are the parameter values to be estimated[4]. In this model, the cumulative probability, P, of dropping out as of time t is given by

$$P = 1 - e^{-rt} = 1 - e^{-e^{(a_1 x_1 + a_2 x_2 + ... + a_n x_n)}t}.$$

It follows that the effect of a unit change in a particular independent variable, other things being equal, is to multiply the cumulative probability of dropping out by the factor e^a, or antilog(a), where a is the parameter value associated with the variable in question. The antilogs of a_1, a_2, etc. are the relative, or proportionate, changes in probabilities of dropping out associated with unit changes in the corresponding explanatory variables. For example, if the parameter estimate associated with having a college-educated father (a zero-one dummy variable) were -.223, the antilog of that estimate would be 0.8 ($e^{-.223} = 0.8$), which would signify that having a college-educated father reduces the probability of dropping out by a multiplicative factor of 0.8, or by 20 percent. To facilitate interpretation of the influences of various factors on dropping out, it is these antilogs, or effects on the relative dropout rates, that we report in the following substantive chapters[5].

The process of carrying out the event-history analysis consisted of four steps:

First, we constructed the dependent variables required by the event-history model-- namely, variables indicating whether and when each individual made the transition from enrolled student to dropout. This entailed applying the previously described dropout definition and resolving any conflicts within and between the survey and questionnaire data bases regarding either the fact or the timing of dropping out.

Second, we applied a procedure to impute values of missing variables. Without this step, the sample size would have been reduced sharply and a great deal of information would have been lost. (As examples of some of the worst cases, family-income data were missing from 9.1 percent of our observations, father's education data from 10.6 percent, and teacher-pupil ratios from 8.7 percent.) The procedure we chose is that of Wise and McLaughlin (1980). It uses regression equations to predict missing values of missing variables and then attaches a random component to the imputed values in such a way that the correlation structure and variances are preserved. It also generates dummy variables ("imputation flags"), which can be used in the multivariate estimation process to determine whether behavior differs between subjects for whom variables have and have not been imputed.

Third, we undertook exploratory data analysis, using quick and inexpensive multiple regression estimation instead of the more demanding event-history procedure, to screen potential explanatory variables and search for important interaction effects.

Fourth and finally, we carried out the event-history estimations, using the computer program known as RATE, developed by Nancy Tuma and her associates at Stanford. The model estimated by RATE assumed a constant hazard function, or relatively stable patterns of dropping out during the time period. Separate estimates were obtained for six race/ ethnicity-sex groups (white, black and Hispanic males and females) and for all groups combined. Four equations were estimated for each such group: one containing personal and family background characteristics only; a second adding locational and economic factors; a third adding school factors; and the fourth adding certain behavioral and choice variables. Selected findings are presented in Chapters III through VII.

Footnotes:

1. The 27-percent figure appears, among other places, in the U.S. Department of Education's highly publicized wall chart, "State Education Statistics" (1985).

2. It is reasonable to expect that more school leavers will return to school or complete high school equivalency programs over time, and this is confirmed by preliminary evidence from the HSB second follow-up survey. According to Kolstad and Owings (1986), 38 percent of those classified as dropouts in the first follow-up had graduated or completed GEDs two years later. Unfortunately, data from the second follow-up were not available in time for our analysis.

3. We did, however, use multiple regression methods for initial screening of explanatory variables, even though the assumptions of multiple regression analysis are violated when the dependent variable is dichotomous.

4. This is the simplest form of the event-history model, in which the rate of dropping out is assumed to be time-invariant. More generally, a multiplicative time-dependent term, $f(t)$ can be appended to the right-hand side of the equation. We have used only the simple, time-invariant form in this analysis. Finally, all models were restricted to times following the sophomore year (base-year) data collection.

5. Note that the corresponding test of statistical significance of a factor's effect on the probability of dropping out is whether the antilog of the parameter estimate is significantly different from 1.0. This is not equivalent to the usual test of whether the parameter estimate itself is significantly different from zero.

III. OVERALL DROPOUT RATES AND RACE/ETHNICITY-SEX DIFFERENCES

Overall, or average, dropout rates are the principal benchmarks for our analysis of influences on dropping out. For example, we will consider in subsequent chapters how dropout rates for students with particular family backgrounds or educational histories differ from average dropout rates for all students. Before undertaking such comparisons, it is important to look closely at the benchmark rates, as revealed by the HS&B data.

It does not suffice to take only a single figure, the average dropout rate for all types of students combined, as the standard of comparison. Dropout rates differ substantially by sex and by race/ethnicity and between public and private schools, and such differences are of great policy interest. We seek to understand influences on the incidence of dropping out among students within the various sex, race/ethnic, and public-private school categories. Consequently, we work with an expanded definition of "overall" dropout rates, which includes average dropout rates cross-classified by sex (male, female), race/ethnicity (white, black, Hispanic), and public or private school, as well as the average dropout rate for the student population as a whole.

The plan of this chapter is as follows. We present, first, the HS&B estimates of the average dropout rate for the 1980 sophomore cohort and, second, the estimates disaggregated by sex and race/ethnicity. We then examine differences between the sexes and race/ethnic groups in more detail, differentiating between gross differences and differences that remain when other background characteristics of students are taken into account. Next, we compare the dropout rate estimates based on HS&B with recent estimates based on other data sources. Finally, we examine dropout rate differences between students in public and private schools and present the overall public school dropout rates. The latter will serve as the principal benchmarks for the analyses in subsequent chapters.

THE OVERALL DROPOUT RATE ACCORDING TO HS&B

According to estimates based on the HS&B panel sample, 13.6 percent of the students enrolled as high school sophomores in spring 1980 were neither high school graduates nor enrolled in high school in spring 1982, and hence were classifiable as dropouts. We refer henceforth to this figure as the overall, or average, dropout rate for the cohort as a whole. The corresponding figure for public school students only is 14.4 percent. We underscore once again, however, that these figures understate significantly the total incidence of dropping out within the 1980 sophomore cohort. At the risk of some repetition, we pause to explain here how the 13.6 percent figure is derived and in what respects it deviates from a "true and comprehensive" dropout rate.

The key technical points underlying the 13.6 percent estimate are the following:

1. The estimate is based on the "HS&B student classifier" definition of dropping out, according to which any student who was not enrolled in high school and had not graduated from high school at the time of the first follow-up survey is considered a dropout.

2. The computation is for the HS&B panel sample, which consists of the subset of HS&B sample students who participated in both the base-year and follow-up surveys; students who participated in one round of the survey but not the other, or in neither round, are excluded.

3. Like all other dropout rates to be cited in this report, the average rate is a weighted estimate, taking into account the sample weight assigned to each student in the panel sample (panel weights were adjusted for nonresponse). That is, the 13.6 percent figure is computed as 100 x (sum of sample weights assigned to students classified as dropouts)/(sum of sample weights of all students in the panel sample).

Because of the large sample size (25,875 students in the panel sample), the error in the overall dropout rate due to sampling variation is negligible. The standard error of the 13.6 percent estimate is only 0.33 percentage points. There are two major sources of error that have nothing to do with sampling variation, however: one, that the HS&B surveys only cover a limited portion of the high school careers of members of the sophomore class of 1980; the other, that the definition of dropping out on which the 13.6 percent figure is based deviates in some respects from both concepts of dropping out discussed in Chapter II.

With respect to the limited coverage problem, it is clear that the most important shortcoming of the overall dropout rate estimate is that it takes no account of students who would have been sophomores in spring 1980 had they not already dropped out of school. Omitting these early dropouts understates the overall dropout rate from the cohort. To be precise, if DO_1 is the fraction of the cohort that dropped out prior to the baseline survey and DO_2 is the fraction that dropped out afterward, the true overall dropout rate, DO_T, is given by

$$DO_T = DO_1 + DO_2(1 - DO_1).$$

Since our estimates reflect DO_2 only, they underestimate the true dropout rate by the amount $DO_1(1 - DO_2)$. For example, if 5 percent of the cohort dropped out prior to the date of the baseline survey ($DO_1 = .05$), and assuming 13.6 percent to be a correct estimate of the rate subsequent to that date ($DO_2 = .136$), the true overall rate would be 0.050 + 0.136(1 - 0.050), or 17.9 percent.

Of course, we cannot measure the dropout rate from the 1980 sophomore cohort prior to spring 1980, but information from other sources suggests that something in the range of 4 to 6 percent (for the total group) is not an unreasonable guess (see comments on dropout rate estimates from other sources at the end of this chapter). Such figures imply that attrition subsequent to spring of the sophomore year constitutes only two-thirds to three-fourths of the total dropping-out phenomenon.

A similar but less serious gap in coverage is that HS&B-based estimates do not reflect dropping out that occurred late in the senior year, after the date of the first follow-up survey. Since follow-up survey questionnaires were administered during the interval February 15-June 11, 1982 (Jones et al., 1983), this unobserved interval may be as long as 4 months for some sample schools. We have been able to establish from the HS&B transcript data, however, that dropping out occurs during these last months of the senior year. Specifically, our estimate, based on transcript information about when students graduated or left school, is that the number of dropouts increased by about 9 percent during those months, which corresponds to an increase of about 1.2 percentage points in the estimated rate.

As to the definitional problems, we have already referred in Chapter II to several respects in which the HS&B student classifier definition deviates from either the "status" or "event" definitions of dropout. According to the status definition, a student is a dropout if at a specified point in time he or she is not enrolled in school and is not a high school graduate or the equivalent. According to the event definition, a dropout is anyone who left school for more than a specified period prior to graduation (for reasons other than illness), even if he or she subsequently re-enrolled and/or graduated.

The HS&B student classifier definition deviates from the status definition in that it counts as dropouts students who left school but completed high school equivalency programs (GEDs). We explained in Chapter II that although an HS&B follow-up item does ostensibly identify GED completers, we consider it unreliable and have not used it to modify the dropout count. The unmodified count overstates, by some unknown percentage between 0 and 10, the number of students in dropout status as of spring 1982. (However, this offsets, wholly or in part, the estimated 9 percent undercount due to failure to include late dropouts--those who departed after the follow-up survey date but before completing the senior year.)

The student classifier definition undercounts those who experienced dropping out as an event in that it takes no account of students who "dropped out temporarily," or "stopped out," but then returned to school. Adjusting for students who reported staying away from school for a quarter or semester or more for reasons other than illness (see Chapter II) adds about 0.9 percentage points to the dropout rate (about 300 cases). However, this adjustment depends on an arbitrary cutoff point regarding length of absence from school and takes no account of the reason for temporary withdrawal. We also identified about 90 cases of "stopouts" by using data from the HS&B transcripts file to infer when students were not attending school; however, this too involves some arbitrariness of classification. We are not confident, therefore, of having estimated the number of temporary dropouts with any accuracy.

In sum, the overall dropout rates reported here and used as the baselines for subsequent comparisons are only the attrition rates between spring of the sophomore year and spring of the senior year. They should not be construed as estimates of the total dropout rate from the 1980 sophomore cohort. (In comparison, the errors due to deviation from the pure "status" or pure "event" definitions of dropping out are relatively minor.) Fortunately, we are interested in the overall rates mainly as standards of comparison for the analysis of influences on dropping out, and for that purpose, the lack of coverage of early dropouts does not appear to be a major disability[1].

VARIATIONS BY SEX AND RACE/ETHNICITY AND BETWEEN PUBLIC AND PRIVATE SCHOOLS

There are important variations in dropout rates among race/ethnic groups, between the sexes, and between students in public and private schools. We consider the race/ethnic and sex differences first and then the public-private dimension.

The average dropout rates within sex and race/ethnic categories are shown in Table 3.1. Like the overall rate for all students combined, these rates are based on the HSB panel sample and student classifier definition, and share the characteristics and shortcomings outlined above. They are gross dropout rates in that they are not adjusted for intergroup differences in factors (other than sex and race/ethnicity per se) that may account for, or explain, the unequal frequencies of dropping out. This is in contrast to the adjusted race/ethnicity and sex differentials presented in the following section.

Table 3.1

GROSS DROPOUT RATES BY SEX AND RACE/ETHNICITY, PUBLIC AND PRIVATE SCHOOLS COMBINED

Race	Male	Female	Both
All groups	14.6	12.6	13.6
White	13.0	11.5	12.2
Black	20.1	13.8	16.8
Hispanic	18.8	18.6	18.7
American Indian	23.6	21.5	22.7
Asian	5.2	4.4	4.8
Other	--	--	8.1

According to this table, the dropout rate is substantially higher for males (14.6 percent) than for females (12.6 percent), and it varies dramatically among racial groups. Blacks drop out at an almost 40 percent higher rate than whites (16.8/12.2 = 1.38); Hispanics drop out at a 53 percent higher rate than whites (18.7/12.2 = 1.53); and American

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Indians, with the highest dropout rate of any group (22.7 percent), are 86 percent more likely to drop out than are whites (22.7/12.2 = 1.86). Asians have the lowest dropout rate, only 4.8 percent; and "other" students, with an 8.1 percent rate, are also less likely to drop out than are whites.

Although male dropout rates exceed female rates in all racial classifications, the male-female differential varies by race/ethnicity. The male dropout rate is 13 percent higher than the female rate among whites and 46 percent higher than the female rate among blacks but only insignificantly higher among Hispanics[2]. Looking at the same thing from a different point of view, black males are 55 percent more likely to drop out than are white males, but the corresponding differential between black and white females is only 20 percent. When blacks are compared with Hispanics, there is actually a reversal of rank between the sexes: the dropout rate for black females is lower than that for Hispanic females by 26 percent, but the rate for black males is higher than that for Hispanic males by 7 percent.

These sex-race/ethnicity interaction effects are important to the remainder of the analysis. Looking only at differences between the sexes or only at differences by race/ethnicity can be misleading. To avoid invalid inferences, the interaction between sex and race/ethnicity must be taken into account. Accordingly, in all subsequent comparative dropout rate tables, we present estimates not only for males and females and for whites, blacks, and Hispanics but also for the six categories defined by classifying students by both race/ethnicity and sex[3].

In Table 3.2, the dropout rates of public school students, categorized by race/ethnicity and sex, are differentiated from those of private school students, and the latter are further broken down into Catholic and "other private." The rates are uniformly higher for public school students than for private school students. Also, within the private school category, they are substantially lower for students in Catholic schools than for those in other types of private institutions[4].

Table 3.2

DROPOUT RATES IN PUBLIC AND PRIVATE HIGH SCHOOLS, BY RACE/ETHNICITY AND SEX

Race and Sex		All Types	Public	High School Type — Private All	Catholic	Other
All groups:	both sexes	13.6	14.4	6.4	3.4	11.8
	males	14.6	15.2	8.6	4.7	14.9
	females	12.6	13.5	4.4	2.2	8.5
White:	both sexes	12.2	13.0	5.6	2.6	10.7
	males	13.0	13.6	7.8	3.8	13.9
	females	11.5	12.5	3.6	1.6	7.4
Black:	both sexes	16.8	17.2	6.2	4.6	a
	males	20.1	20.6	6.3	8.2	a
	females	13.8	14.1	6.2	1.8	a
Hispanic:	both sexes	18.7	19.1	13.6	9.5	a
	males	18.8	18.9	16.7	10.7	a
	females	18.6	19.3	11.0	8.2	a

aSample size too small for reliable estimation.

The pattern of differences between the sexes and among race/ethnic groups is basically the same for public school students only as for public and private students combined. Male public school students drop out at higher rates than female public school students (although the percentage difference is somewhat less than when private school students are included). The ranking of the racial groups remains unchanged (although percentage differences between white and minority dropout rates are somewhat reduced when the comparison is confined to public schools), and the same interactions between sex and race/ethnicity are observable for public school students as for students in general. Public school dropout rates are higher in all categories than the corresponding private rates.

Because the differences between public and private school students are large, it would be misleading to combine the two groups in analyses of the effects of specific student, school, and environmental characteristics on the dropout rates. For this reason, the subsequent analysis of factors associated with dropping out focuses on the public school students only. Ideally, we would perform parallel analyses of influences on dropping out among private school students. However, the small size of the HS&B private school sample (or, more precisely, the small number of dropouts within that sample) makes it infeasible either to break down dropout rates by detailed categories of private students or to estimate a satisfactory multivariate model of determinants of dropping out in private schools.

SEX AND RACE/ETHNICITY DIFFERENCES WITH OTHER BACKGROUND FACTORS CONTROLLED

Race/ethnic differences in dropout rates and, to a lesser extent, differences between the sexes, are important for a variety of policy purposes. They are critical both for analyzing the determinants of dropping out and for designing dropout prevention programs. To avoid misunderstandings, it is essential to distinguish sharply between the gross, or uncontrolled, dropout rate differences among race/ethnic groups reported above and the net differences that remain when student background factors other than race/ethnicity and sex per se are taken into account. To show the importance of this distinction, we present here the adjusted race/ethnicity and sex differentials that result when other background factors are taken into account and compare them with the unadjusted figures given above.

Table 3.3 shows the two sets of rates for students in public schools. Those labeled "uncontrolled" are identical to the rates shown in the public school column of Table 3.2. Those labeled "other background factors controlled" are derived from a multivariate statistical model, which yields estimates of the dropout-rate differentials that remain among race/ethnic-sex categories when certain socioeconomic characteristics and other family background attributes are held constant. The model used is the event-history model described in Chapter II. The specific variables held constant, or controlled for, in this model include father's and mother's occupational level, father's and mother's educational attainment, self-reported family income, presence of father and/or mother in the home, number of siblings, whether the mother worked while the student was in school, religious affiliation, and religiosity.

The model has been fitted to data for the subsample of students for whom HS&B transcripts data were available (the transcript sample). The adjusted dropout rates shown in Table 3.3 have been obtained by applying relative dropout-rate estimates from these event-history equations to the average estimated dropout rate, 14.4 percent, for all public school students.

By comparing the two columns of Table 3.3, one can see that the large dropout-rate differences among whites, blacks, and Hispanics (although not between the sexes) diminish, vanish, or are even reversed when personal and family background factors are taken into account. Note, in particular, that when socioeconomic and other family background factors are controlled, blacks have lower estimated dropout rates than whites; black females have

a lower estimated rate than any other group; Hispanics have only slightly higher rates than whites; and the rates for white and Hispanic males are essentially equal. In sum,

Table 3.3

DROPOUT RATES BY RACE/ETHNICITY AND SEX, WITH AND WITHOUT
CONTROLLING FOR OTHER BACKGROUND CHARACTERISTICS,
PUBLIC SCHOOL STUDENTS

Race and Sex		Dropout Rates Uncontrolled	Other Background Factors Controlled
All groups:	both sexes	14.4	14.4
	males	15.2	15.7
	females	13.5	13.1
White:	both sexes	13.0	14.8
	males	13.6	16.0
	females	12.5	13.6
Black:	both sexes	17.2	10.5
	males	20.6	13.3
	females	14.1	8.1
Hispanic:	both sexes	19.1	16.0
	males	18.9	16.1
	females	19.3	15.8

the entire black-white difference in uncontrolled dropout rates (and then some) and much of the Hispanic-white difference is accounted for by factors other than race/ethnicity per se.

These same relationships are shown from a different perspective in Table 3.4, which displays selected ratios of dropout rates with and without controlling for background characteristics. Note the dramatic reversal of the ratio of black to white dropout rates--from 1.3 to 0.7--when SES and other personal background factors (other than race/ethnicity and sex) are held constant. Note also the sharp decreases in ratios of Hispanic to white rates when other factors are controlled.

A cautionary note is in order, however. Although these results indicate that factors other than race/ethnicity directly, such as parents' education and family structure, account for interracial differences in dropout rates, this does not necessarily imply the absence of racial effects. The SES and other family background variables held constant in the analysis may themselves be partially determined by race/ethnicity. For instance, parents' race/ethnicity is probably an important determinant of such status attributes as parents' educational attainment and parents' occupations. Thus, although there is no residual black-white dropout-rate differential to explain once SES and other background factors have been taken into account (in fact, the residual is in the other direction), race/ethnicity may still play an indirect role through its influence on socioeconomic and other family characteristics.

Table 3.4

SELECTED DROPOUT-RATE RATIOS, WITH AND WITHOUT CONTROLLING FOR OTHER BACKGROUND FACTORS

	Dropout-Rate Ratio	
Comparison Groups	Uncontrolled	Other Background Factors Controlled
Females/males	0.89	0.83
Blacks/whites	1.32	0.71
Hispanics/whites	1.47	1.08
White females/white males	0.92	0.85
Black males/white males	1.51	0.83
Black females/white males	1.04	0.51
Hispanic males/white males	1.39	1.01
Hispanic females/white males	1.42	0.99
Black females/white females	1.13	0.60
Hispanic females/white females	1.54	1.16

COMPARISONS WITH DROPOUT RATE ESTIMATES FROM OTHER SOURCES

Apart from High School and Beyond, two other national surveys have been used recently to estimate the incidence of dropping out. One is the National Longitudinal Survey of Youth Labor Market Experience (NLS-YLME), which was drawn on by Rumberger (1983) to investigate dropout rates in 1979. The other is the Census Bureau's Current Population Survey (CPS), which yields periodic estimates of dropout rates, including estimates for 1981 reported in Grant and Snyder (1983). Comparisons between the HS&B overall dropout rates and those from the other surveys are useful, first, for indicating the uncertainty that exists regarding the "true" rates, and second, for the light they shed on the meaning and limitations of the HS&B figures. The key data required for such comparisons are presented in Table 3.5.

The two main things to keep in mind in comparing the HS&B figures with other estimates are the age ranges to which the different estimates pertain and the restricted definition of "dropout rate" dictated by the HS&B survey design. The HS&B results pertain to persons who would normally have been high school seniors, i.e., 17 or 18 years old, when classified as dropouts or nondropouts. In contrast, the other surveys pertain to wider age ranges--14 to 21 in the case of NLS-YLME and 14 to 34 in the case of the CPS. Fortunately, the dropout rate estimates from these data sets have been disaggregated by age, as indicated in the table. The estimates for 18-19 year olds come closest to corresponding to those for the HS&B cohort, although the correspondence is far from exact[5].

As to the definition of dropout rate, the HS&B figures, as explained previously, represent the rate of attrition between the sophomore and senior years, while the NLS-YLME and CPS figures represent percentages of persons in dropout status at the time of the survey without regard to when they left school. Unlike HS&B, the other surveys do count individuals who dropped out prior to spring of the sophomore year as well as those who dropped out late in the senior year. One would expect, therefore, that dropout rate estimates based on the other surveys would be significantly higher than those based on HS7B. It is true, on the other hand, that persons who have completed high school equivalency programs are not considered dropouts in the CPS and NLS-YLME surveys, whereas they are included in

the HS&B dropout count. However, the resulting overestimate in HS&B constitutes only a fractional offset to the omission of early dropouts.

As mentioned earlier, Rumberger's finding of an overall dropout rate of 18 percent is consistent with the HS&B estimate of 13.6 percent, assuming that 4 to 5 percent is a reasonable estimate of the dropout rate prior to the latter half of the sophomore year. Although we cannot confirm that 4-5 percent is correct, it is at least not contradicted by the estimated rate of 9 percent shown in Table 3.5 for 16-17 year olds (sophomores and juniors) and the rate of 2 percent reported for 14-15 year olds in Rumberger (1983). Based on the same reasoning, the Census CPS estimate of a 16.0 percent dropout rate for

Table 3.5

HS&B DROPOUT RATES COMPARED WITH DROPOUT RATE ESTIMATES BASED ON OTHER DATA SOURCES

Race/ ethnicity and Sex	HSB 1980 Sophomores in 1982	NLS-YLME, 1979, by age			Census CPS, 1981, by age		
		16-17 years	18-19 years	14-21 years	16-17 years	18-19 years	14-34 years
All groups	13.6	9	18	11	7.8	16.0	13.9
Male	14.6	--	--	--	8.0	17.7	13.0
Female	12.6	--	--	--	7.6	14.4	14.8
White	12.2	8	16	10	7.8	15.5	13.0
Male	13.0	8	17	10	8.1	17.9	12.4
Female	11.5	9	14	9	7.5	13.2	13.6
Black	16.8	10	24	15	8.0	19.3	21.2
Male	20.1	12	25	17	7.2	18.9	19.3
Female	13.8	8	22	14	8.7	19.7	22.6
Hispanic	18.7	17	36	23	--	--	--
Male	18.8	18	32	22	--	--	--
Female	18.6	17	39	24	--	--	--

Sources: HS&B data extracted from Table 3.1; NLS-YLME (National Longitudinal Survey of Youth Labor Market Experience) estimates from Rumberger (1983); Census CPS (Current Population Survey) estimates from Current Population Reports, Series P-20, No. 373, as reported in Grant and Snyder (1983).

18-19 year olds seems too low to be consistent with the HSB findings, since it implies an attrition rate prior to spring of the sophomore year of only 2 to 3 percent.

It has been argued plausibly that dropout rate estimates based on the CPS data are likely to be biased downward by the nature of the data-gathering procedure. Information on characteristics of students, including whether they have graduated or are enrolled in high school, is generally provided to Census interviewers by the head of the household or some other adult and not by the student in question. It has been suggested that there is some tendency for respondents to avoid describing their children as dropouts, and hence that graduation and/or enrollment rates are likely to be exaggerated. Of course, dropping out is a slippery concept and respondents may not know their children's actual status. We cannot demonstrate that this is the cause of the apparent inconsistency, but it is a hypothesis consistent with the data.

Certain additional inconsistencies become evident when one compares the dropout rate estimates for particular race/ethnic-sex categories. The NLS-YLME estimates for Hispanics are much higher relative to those for whites than are the estimates derived from HS&B (no CPS estimates are presented for Hispanics). The dropout rate for black females, which is only moderately higher than for white females and much lower than for black males according to HS&B, is much higher according to the other two surveys; in fact, according to the CPS data, it exceeds the rate for black males. This is a striking and disturbing contradiction, for which, regretably, we have no explanation.

Finally, before returning to the analysis of HS&B data, it is appropriate to take note of an entirely different--and much higher--set of dropout rate estimates that has recently received much publicity and figured in policy debates over the dropout problem. These estimates, recently disseminated in a U.S. Department of Education "wall chart" (U.S. Department of Education, 1985), are derived from state-reported graduation rates-- that is ratios of the number of public high school graduates in a given year to ninth grade enrollment four years earlier. The average graduation rate for the nation in 1983 was 73.9 percent, which implies an attrition, or "dropout," rate of 26.1 percent. Figures over 30 percent are reported for some states. Such rates are inconsistent not only with the HS&B estimates but also with those based on the other surveys. The discrepancy may reflect, in part, conceptual differences between attrition estimates based on nongraduation rates and those based on surveys of individuals. The former are influenced by interstate migration of students and delayed graduations, and they take no account of GED completions. For the nation as a whole, however, the migration factor should cancel out; the delayed graduation factor is not significant when high school enrollments are relatively stable; and the GED factor is very minor for the age group in question. There does seem to be a fundamental inconsistency, therefore, that remains to be explained.

Footnotes:

1. It is possible, of course, that the factors influencing the behavior of early dropouts, not represented in the HS&B data, are different from the factors that influence students to drop out between their sophomore and senior years. All our findings about factors associated with dropping out apply, strictly speaking, only to those who drop out after reaching the second half of the sophomore year.

2. In the discussions of descriptive statistics in this and subsequent chapters, statements about the statistical significance of differences between dropout rates are based on a 5-percent error criterion ($p < .05$). In applying this criterion, we allow for a design effect of 1.6 over and above the conventionally calculated standard error--i.e., the error used in calculating t values is 1.6 times that yielded by the SAS standard error procedure. This means that a t value of 2.5 is required for a difference between two dropout rates to be deemed significant at the .05 level.

3. The breakdowns by race/ethnicity are limited to whites, blacks, and Hispanics because the dropout subsamples within other racial categories are too small to support crosstabular analyses of factors associated with dropping out.

4. Catholic school students account for 85 percent of all private school students in the HSB panel sample, so the reported dropout rates for private school students predominantly reflect the low rates in Catholic schools rather than the higher rates in "other private" schools.

5. Most students are 18 years old by spring of the senior year but a sizable number are still 17. Most 19 year-olds have been out of high school for a year. Unfortunately, therefore, the HS&B cohort straddles two of the age brackets, 16-17 and 18-19, used in the other surveys.

We begin the analysis of differential dropout rates by considering how the rates vary among public school students with different personal and family attributes. These attributes include socioeconomic status (SES) variables, such as parents' occupational and educational levels and family income, and other background characteristics, such as presence of parents in the home, number of siblings, and religious affiliation. We present descriptive statistics on the dropout-rate variations first and then introduce findings from the multivariate analysis of influences on dropping out.

SOCIOECONOMIC STATUS

Dropout rates vary considerably, and sometimes dramatically, among students from different socioeconomic backgrounds. This is true almost without regard to how socioeconomic status (SES) is measured. However, the relationship between the socioeconomic variables and dropout rates often differs substantially between the sexes and among white, black, and Hispanic students.

Table 4.1 presents descriptive statistics on dropout-rate variations in relation to SES variables. These variations are shown for each of the six race/ethnicity-sex combinations and for all groups combined. It is immediately apparent that the rates are highly sensitive to some of these variables, notably father's occupation, father's and mother's education, and the composite SES index. In the following paragraphs, we explain briefly how the various SES factors are defined and measured and comment on some of the more significant patterns of variation.

Parents' Occupations

In the interest of simplicity, the occupational categories of the HS&B survey have been condensed into just three broad occupational groupings: a managerial/professional/technical (high-level) category and mid-level and low-level categories[1]. In addition, the classification of mother's occupations includes a "homemaker" category[2]. According to Table 4.1, the dropout rates for students with fathers in mid-level and low-level occupations (all race/ethnicity-sex groups combined) are 62 percent greater and 115 percent greater, respectively, than the rates for students with fathers in high-level occupations. The relationship to mother's occupation is also clear but not as strong: students with mothers in mid-level and low-level occupations are 12 percent and 72 percent more likely to drop out, respectively, than students with mothers in the high-level category. Dropout rates for students whose mothers are homemakers generally fall between those of students with mothers in the low-level and mid-level occupational strata.

The dropout rates of both male and female students vary with parents' occupations, but the relationship is stronger for females. Female students with fathers in the managerial/professional/technical stratum drop out at less than 40 percent the rate of females with fathers in low-level occupations, while males with fathers in the managerial/professional/technical category drop out at over half the rate of males with fathers in low-level occupations. In other words, having a father in a high-level occupation seems to do less to reduce the probability of dropping out for males than for females.

The relationship between dropout rates and parental occupations also varies by race/ethnicity. Among whites, the rates are clearly related to both mother's and father's occupation. Among blacks, dropout rates differ between the high-level and low-level parental occupation groups, but in the mid-range there is no clear relationship. In the HS&B sample, the dropout rate is higher (although not significantly so) for black males with mid-level than low-level fathers and lower for females with mid-level than high-level

fathers. Also, the black male dropout rate varies only minimally with mother's occupation. Similarly, the sensitivity of Hispanic dropout rates to parents' occupation is low, with no evident relationship for males.

Table 4.1

DROPOUT RATES BY SOCIOECONOMIC CHARACTERISTICS, PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

Socioeconomic Characteristic	All	Race/ethnicity and Sex					
		White		Black		Hispanic	
		Male	Female	Male	Female	Male	Female
All students combined	14.4	13.6	12.5	20.6	14.1	18.9	19.3
Father's occupation							
Low-level	18.7	19.6	17.9	19.6	16.4	18.4	21.4
Mid-level	14.0	12.3	12.5	23.1	12.2	19.4	18.6
Professional/technical	8.7	9.1	6.6	13.1	13.5	16.8	8.7
Mother's occupation							
Homemaker	15.6	15.1	11.9	24.0	19.4	19.9	20.7
Low-level	18.5	18.0	16.7	20.6	16.2	24.9	22.3
Mid-level	12.8	12.1	12.6	20.3	10.2	14.8	14.9
Professional/technical	10.6	10.7	8.3	17.4	8.9	15.1	14.3
Father's education							
Less than high school	22.9	22.6	23.0	25.9	21.1	21.9	23.8
High school graduate only	13.7	13.2	12.5	17.9	10.0	17.3	18.0
Some college	10.5	9.8	9.6	16.9	9.5	18.3	8.7
College graduate or more	6.8	8.7	3.7	15.2	6.1	9.9	12.5
Mother's education							
Less than high school	24.9	25.4	26.0	21.9	20.9	23.8	27.6
High school graduate only	12.6	12.9	9.8	18.6	13.5	17.9	13.8
Some college	12.0	11.4	11.3	22.5	7.5	18.7	11.0
College graduate or more	7.2	7.4	4.8	15.2	6.3	7.7	16.2
Family income							
Lower third	21.7	23.1	22.2	19.9	15.8	22.8	25.1
Middle third	12.4	11.7	11.1	20.7	8.9	17.5	16.2
Upper third	13.1	12.4	10.8	21.2	16.9	17.8	17.1
Composite family SES index							
First (lowest) quartile	22.3	23.8	23.7	19.9	16.7	23.3	22.8
Second quartile	13.2	11.9	13.1	15.6	4.6	21.3	17.0
Third quartile	10.7	10.7	9.7	20.5	10.3	12.5	9.4
Fourth (highest) quartile	7.0	8.5	3.9	18.0	8.1	10.0	11.5

On average, students who say their mothers are homemakers drop out at rates in between those who report mothers in low-level and mid-level occupations, but this does not hold uniformly across groups. Whites and Hispanics with homemaker mothers have lower dropout rates than those with mothers in low-level occupations; but blacks with homemaker

mothers are more likely to drop out than blacks with mothers employed even in low-level jobs.

Parents' Educational Attainment

Dropout rates are even more strongly related to parents' education than to parents' occupations. Table 4.1 distinguishes among four educational levels: less than high school graduation, high school graduation only, some postsecondary education, and college graduation or more. Compared to students with the most educated fathers (college graduates or more), students whose fathers have "some college" are over 50 percent more likely to drop out; those whose fathers are high school graduates only are about 100 percent more likely to drop out; and those whose fathers did not finish high school are nearly 250 percent more likely to drop out. There is a similarly negative relationship between dropout rates and mother's education. The most pronounced differences are between students whose parents are at the lowest educational level (less than high school) and those whose parents have at least finished high school.

Although both male and female dropout rates are associated with parents' education, the latter are more strongly associated than the former. The range of variation in male dropout rates between the lowest father's education stratum and the highest is about 2-1/2 to 1, but the corresponding range for females is more than 5 to 1. Similarly, male dropout rates are three times as high in the lowest mother's education stratum as in the highest, while female rates differ by a ratio of more than 4 to 1 between the same two strata. It can be seen that the male and female rates are nearly identical in the lowest parents' education stratum, which means that the male-female difference in sensitivity to parental education is due to differences in the rates at which sons and daughters of better-educated parents leave school. The sons of college-educated fathers are more than twice as likely to drop out as the daughters of similarly educated fathers, whereas males in general are only 13 percent more likely to drop out than females.

The relationship between parents' educational attainment and the dropout rate varies strikingly among the race/ethnicity-sex groups. It is strongest among white females. White females with college-educated fathers drop out at only 16 percent the rate of those whose fathers did not finish high school; the corresponding figures for black and Hispanic females, respectively, are 29 and 53 percent. White males whose fathers are at least college graduates drop out at 38 percent the rate of those whose fathers did not complete high school, while the corresponding figures for black and Hispanic males are, respectively, 59 and 45 percent. Thus, the interracial differences in the effects of father's education are greater for females than for males.

The relative importance of mother's and father's education varies among categories of students. Among whites, the dropout rate is affected by the educational attainment of the parent of the opposite sex. However, for both white males and white females, having a parent with less than a high school education drives up the dropout rate more drastically if that parent is the mother. Among blacks, in contrast, both male and female dropout rates are more sensitive to the father's educational level than to the mother's. Among Hispanics the pattern is mixed, but having a mother in the less-than-high-school category is associated with higher dropout rates than having a father in the same low stratum. In this respect, Hispanics resemble whites more closely than they do blacks.

A notable finding from the education sections of Table 4.1 is that among students whose fathers did not complete high school, there are essentially no significant interracial differences in dropout rates. The rates for black females and Hispanic males are actually lower (but not significantly so) than the corresponding rates for whites. Considering that higher percentages of blacks and Hispanics than whites come from families in which one or both parents did not complete high school, these results indicate that the higher overall dropout rates for blacks and Hispanics than for whites are due in large part to differences in parental education or, more generally, to differences in parental SES.

Self-Reported Family Income

Family income is a fundamental indicator of socioeconomic status and should play an important role in this analysis, but unfortunately, the HS&B income variables are of dubious quality. In the HS&B base-year survey, students were asked to indicate in which third and which seventh of the income distribution their families belonged[3]. The non-response rates for these questions are relatively high, and there is evidence that the reliability of the income data is low (Rosenthal et al., 1983). Thus, we cannot report confidently on how dropout rates vary in relation to family income. Nevertheless, we do include one of these questionable income indicators--the breakdown of family income by thirds--in the analysis.

The relationship between income and the dropout rate is weaker and less clear-cut (non-linear) than one would anticipate with a reliable income indicator. The all-group dropout rate is higher for students who place their families in the lowest third of the income distribution than for other students, as one would expect, but the rate in the top third is actually higher (although not significantly so) than the rate in the middle third, contrary to expectation. This pattern holds for whites and Hispanics of both sexes but not for blacks. The black female dropout rate is much lower among students who place their families in the middle third of the income distribution than for those who indicate either the top or bottom third. Black male rates vary hardly at all among the three strata. These are not plausible results, and in our view they probably reflect the deficiencies of the income data more than the underlying reality.

A Composite SES Index

In addition to the individual socioeconomic status variables, HS&B provides a composite socioeconomic status indicator based on replies to selected questions from the base-year survey. The composite indicator is derived by averaging standardized scores on five items: (1) father's occupation, coded according to the Duncan SEI scale (Jones et al, 1983; Riccobono et al., 1981), (2) father's education, (3) mother's education, (4) family income (reported by the students), and (5) an average of eight household possession items[4]. Thus, the SES composite brings together a number of the items discussed separately above, plus some additional family characteristics associated with socio-economic level.

The relationship of dropout rates to the composite SES index is similar to the relationship to parents' education. Dropout rates of students in the lowest SES quartile are three times greater, on average, than rates of students in the highest quartile. Also, as with the education factor, the largest differences in dropout rates occur between the first (lowest) SES quartile and all others. Both male and female dropout rates are sensitive to family SES, but the female rates are more sensitive, especially among the higher SES levels. Females drop out at 83 percent of the male rate in the third quartile but at only 50 percent the male rate in the highest quartile. This pattern, too, is very similar to that reported earlier in connection with variations in father's education.

The relationship of dropout rates to SES also varies by race/ethnicity. Among whites, the rate falls off steadily as a function of increasing SES, most sharply between the first and second quartiles and more rapidly thereafter for females than for males. Among black males, in contrast, there is no tendency for the dropout rate to decline with increasing SES scores[5]. Among black females, there is a decline in the rate after the first SES quartile but no clear pattern thereafter. The pattern for Hispanics is much more similar to that of whites than that of blacks--a generally declining dropout rate as SES increases.

The data in Table 4.1 also support the findings reported in Chapter III regarding interracial differences in dropping out. Note that in the lowest occupational, educational, and composite SES strata, dropout rates for blacks are similar to, and in some cases lower

than, the corresponding rates for whites. Considering that much higher percentages of blacks and Hispanics than whites come from these strata, it is clear that interracial differences in the SES distribution play major roles in determining gross differentials in dropout rates by race/ethnicity.

OTHER FAMILY BACKGROUND CHARACTERISTICS

In addition to socioeconomic status indicators, several other personal and family characteristics reported in HS&B are associated with the frequency of dropping out. Table 4.2 presents descriptive statistics pertaining to the following: presence of parents in the home, number of siblings, whether the mother worked while the student was in school, religious affiliation, and religiousity.

Presence of Parents in the Home

The degree to which a family is "intact" affects dropping out in much the same manner as does socioeconomic status. The data in Table 4.2 show how dropout rates vary among students who live with both parents, a female parent only, a male parent only, and neither parent. For all groups combined, having only one parent in the home is associated with a substantially higher dropout rate than having both parents present (a 66 percent higher rate if the one parent is female and a 78 percent higher rate if that parent is male). Having neither parent present is associated with a dropout rate 2-1/2 times greater than the rate with both parents in the home. The absence of a male parent generally seems to make less difference than the absence of the female parent, although for blacks the opposite is true.

Dropout rates of both male and female students are affected strongly by the presence of parents, but there is an interesting difference between the sexes: taking all race/ethnic groups together, males appear to be more sensitive than females to the absence of one parent, while females are more sensitive than males to the absence of both parents. When race/ethnicity is taken into account, the pattern becomes more complex. White males with only one parent in the home drop out at about twice the rate of white males living with both parents, but the absence of both parents raises the rate only about 25 percent more than the absence of one. In comparison, white females drop out at about a 50-percent higher rate in one-parent than in two-parent households, but the rate doubles if both parents are absent from the home.

Note that blacks from one-parent and no-parent homes drop out at lower rates than whites from similar households. This reinforces the finding that differences in background variables other than race/ethnicity are associated with the higher gross dropout rates observed for blacks than for whites.

Number of Siblings

Another family background variable associated with the dropout rate is the number of a student's siblings. The likelihood of dropping out generally increases with the number of siblings, except that being an only child (zero siblings) is associated with a higher dropout rate than having 1-3 brothers and sisters. The pattern is clearer for males than for females and for whites than for minorities. It is least clear for blacks. In fact, for black males, number of siblings has no significant effect. For all groups other than blacks, however, the dropout rates of students from very large families (7 siblings or more) are significantly higher than for students from smaller families. It is likely, of course, that the apparent family-size effect is largely, if not wholly, a class or SES effect, since large families are more common in lower-SES strata.

Table 4.2

DROPOUT RATES BY FAMILY CHARACTERISTICS (OTHER THAN SES),
PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

Family Characteristic	All	White Male	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
All students combined	14.4	13.6	12.5	20.6	14.1	18.9	19.3
Parents present in home							
Both	12.2	11.3	11.2	17.5	11.7	17.0	14.8
Female only	20.2	23.4	16.5	21.9	16.1	23.0	27.6
Male only	21.7	24.1	18.2	17.1	13.5	25.0	27.9
Neither	31.1	29.4	36.7	35.3	21.8	22.9	40.8
Number of siblings							
None	13.8	14.7	11.0	13.9	15.4	17.2	19.0
1	9.0	8.9	7.1	18.8	8.0	12.8	17.7
2	11.1	9.9	10.7	18.1	6.3	16.2	17.5
3	12.9	14.1	10.6	17.9	11.1	16.5	16.1
4	16.8	14.3	17.0	19.6	17.6	24.4	17.5
5	18.9	13.7	21.3	21.8	14.9	22.9	18.9
6	18.0	18.1	15.7	21.7	19.6	16.3	19.4
7 or more	22.4	28.3	20.1	17.1	17.0	23.0	25.5
Whether mother worked while student in school							
Yes, both elem. and H.S.	13.7	12.7	13.4	15.6	10.6	18.6	18.9
Yes, elementary only	17.3	19.2	12.7	28.7	16.3	22.1	15.2
Yes, high school only	10.7	11.7	9.0	9.3	19.6	11.8	11.7
No	12.4	11.0	9.5	21.1	19.9	18.0	21.6
Religious affiliation							
Protestant	13.0	12.6	11.6	17.8	11.7	18.1	17.4
Catholic	11.6	9.6	10.8	11.0	17.4	14.9	18.9
Jewish	8.8	10.3	6.8	--	--	--	--
Other	18.9	19.3	19.0	29.3	14.3	20.1	20.0
None	23.6	24.4	24.6	20.2	18.9	30.8	24.1
Religiousity							
Very religious	9.3	8.3	4.7	21.2	15.3	14.9	20.8
Somewhat religious	12.4	10.8	11.8	15.8	12.6	17.3	16.5
Not religious	19.1	18.9	18.0	25.8	14.3	21.3	22.9

Mother's Work Status

A question of recent policy interest is whether mothers' employment affects the educational outcomes of children. In this analysis, we consider whether the likelihood of a student's dropping out is affected by whether the mother works outside the home while the student attends elementary school, high school, or both. The results are surprisingly mixed: First, the dropout rates of students whose mothers work only while the students attend high school are lower than the rates for students whose mothers do not work at all

(with the exception of white males). Second, the rates for students whose mothers work only while the students attend elementary school are significantly <u>higher</u> than rates for those whose mothers do not work at all (except for black and Hispanic females). But third, the rates for students whose mothers work during both the elementary and high school years fall in between the rates of the other two groups. We do not know why the mother's employment throughout the student's school career should have less of a negative effect on dropping out than employment during the elementary years only. A conjecture is that mothers employed throughout tend to have greater labor force attachment, and hence higher income and SES than mothers employed only during certain intervals; however, it is by no means certain that this accounts for the results.

The effect of mother's work status differs sharply for male and female students in one respect: male dropout rates are much more sensitive than female rates to whether the mother worked while the student attended elementary school. Dropout rates for males of all race/ethnicity groups are much higher in the mother-worked-while-in-elementary-school-only group than in any of the other "mother-worked" categories. There is no such effect for females. As to interracial differences, the most conspicuous item is that the mother's not working at all--a positive factor for whites--is a negative factor for blacks. This may be because the status of nonworking mother is associated with relatively lower SES and income levels for blacks than for whites and that the SES and income factors, rather than the mother's working per se, account for the dropout-rate differential.

Religious Affiliation

There are significant differences in dropout rates among students with different religious affiliations. Rates for Catholics are generally lower than rates for Protestants, and rates for Jews are lower still. Students who claim "othe." or no religious affiliation drop out at much higher rates than those who identify *hemselves as Catholics, Protestants, or Jews. The relative rates differ by sex, however. A nois males, the Catholic dropout rate is significantly lower than the Protestant rate are not significantly higher than the Jewish rate. Among females, the Catholic and rotestant rates are almost equal, but the Jewish rate is much lower than both[6].

Religiousity

We use the term "religiousity" to characterize students according to their responses to the question, "Do you think of yourself as a religious person?" The permitted answers are "yes, very," "yes, somewhat," and "no, not at all." The dropout rate decreases sharply with increasing religiousity. It is more than twice as high among students who describe themselves as not religious at all as among those who call themselves very religious. The relationship between dropping out and religiousity exists for white males and females and for Hispanic males but is not discernible for blacks or Hispanic females. Among whites, it is stronger for females than for males because of the low rate at which "very religious" white females leave school.

Another HS&B question on religion asked how frequently students attend religious services. The results (not shown in the table) are similar to those for the religiousity item--i.e., a decline in the dropout rate as the frequency of religious attendance increases.

THE MULTIVARIATE ANALYSIS[7]

Because many of the socioeconomic and other family background variables are intertwined with one another, it takes a multivariate analysis to sort out their net effects. We have conducted that analysis, as explained in Chapter II, using the event-history methodology. The results reported here are derived from equations in which the explanatory variables include many of the personal and family background characteristics of students

discussed above plus regional and urbanicity variables, which are explained below. The results are expressed as multiplicative effects of each variable (other things being equal) on the probability of dropping out.

Table 4.3 presents findings from the event-history model concerning the effects of selected SES and other family background characteristics on dropout rates. Figures are given for the same six race/ethnicity-sex categories as in the foregoing descriptive data tables and for all six groups combined[8]. The entries in this table are dropout-rate ratios; that is, they represent the factor by which the dropout rate changes in response to the indicated change in an explanatory variable. For example, the entry 1.20 in the comparison between students with fathers in the low-level and mid-level occupational categories at the top of the first column of the table signifies that those with fathers in low-level jobs are 1.2 times, or 20 percent, more likely to drop out, other things being equal, as those with fathers in mid-level jobs.

To see the relationship between these results and the descriptive data on dropout rates, consider the first column of Table 4.3, which pertains to all race/ethnicity groups and sexes combined. Note that all the following results are consistent with the dropout-rate differences reported above: (a) the dropout rate is higher for students whose mothers or fathers work in low-level jobs than for those whose parents work in mid-level jobs (it is higher for students with parents in high-level than in mid-level jobs but not significantly so), (b) the rate decreases with both father's and mother's educational level, (c) it decreases slightly with increasing family income, (d) it is higher for students with only one parent in the home and higher still for students with neither parent at home, (e) it increases with the number of siblings, (f) it is higher if the mother worked during the student's elementary school years but not if the mother worked only during the student's high school years, and (g) it decreases with increasing religiousity.

On the other hand, the magnitudes of the effects in Table 4.3 are considerably different from those suggested by the earlier gross dropout-rate comparisons. In particular, the differences associated with SES variables are considerably smaller in the multivariate analysis. This, of course, is exactly what one would expect, given the strong colinearity among the various SES factors. For example, according to the gross dropout rate comparisons in Table 4.1, the probability of dropping out is 50 percent less for students whose fathers are "college graduates or more" as for those whose fathers are "high school graduates only," but according to Table 4.3 the reduction in the rate associated with four additional years of father's education is only 15 percent. The reason for the difference is that the level of father's education is correlated with other status indicators. On average, a student with a college-educated father is also likely to have a more educated mother, higher income, and both parents in higher occupational strata than a student with only a high-school-educated father. Naturally, therefore, the effect of father's education appears greater when nothing is controlled than when the other SES factors are held constant.

The combined effects of differences in multiple attributes may be estimated by multiplying together the individual effects shown in Table 4.3. Thus, for example, the combined effect of having both a father and a mother with college rather than high school diplomas, and a father with a mid-level rather than low-level occupation would be a reduction in the dropout probability by 40 percent[9].

Another perspective on the relationship between gross and net effects on dropout rates is offered by Table 4.4, which provides side-by-side comparisons of relative gross and net rates. The entries in the first column of this table are ratios of gross dropout rates from Tables 4.1 and 4.2. The second column is repeated from Table 4.3. Note that in the cases of SES variables, the increases or reductions in dropout rates always appear much larger in the gross, or uncontrolled, comparison than in the multivariate comparison. This reflects the aforementioned colinearity. The same is not true of the non-SES variables, however. The dropout-rate differences associated with, e.g., family structure, mother's work status, and religion diminish only moderately when other factors are held

Table 4.3

ESTIMATED EFFECTS OF SELECTED SOCIOECONOMIC AND OTHER
BACKGROUND VARIABLES ON RELATIVE DROPOUT RATES,
EVENT-HISTORY MODEL, BY RACE/ETHNICITY AND SEX

Variable and Basis for Comparison	All	White Male	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
Father's occupation:							
Low-level/mid-level	1.20*	1.31*	1.19*	1.04	1.72*	.81	1.21
High-level/mid-level	.96	.96	.85	.75	2.25	1.34	.78
Mother's occupation:							
Low-level/mid-level	1.13*	1.08	.97	.87	1.45	1.96*	1.46
High-level/mid-level	.93	.94	.78	1.12	.90	.91	1.14
Homemaker/mid-level	1.07	1.13	1.04	1.44	.78	1.01	1.10
Father's education:							
Each additional year	.96*	.99	.92*	1.00	1.06	.95*	1.00
[Additional 4 years]	.85	.94	.71	.98	1.24	.80	1.00
Mother's education:							
Each additional year	.95*	.98	.93*	.98	.85*	.99	.94*
[Additional 4 years]	.84	.91	.75	.93	.52	.98	.76
Family income:							
Additional $1,000	.98*	.98*	.98*	.99	1.00	.97*	.99
Parents in home:							
mother only/both parents	1.28*	1.49*	1.06	1.06	2.08*	1.11	1.49
father only/both parents	1.65*	1.66*	1.31	.85	2.26	1.80	2.74*
neither/both parents	2.06*	2.20*	3.13*	2.22*	1.28	.98	1.84
Number of siblings:							
One additional sibling	1.11*	1.14*	1.10*	1.03	1.24*	1.08*	1.09*
Mother worked:							
During elementary years	1.36*	1.55*	1.40*	1.42	.43*	1.05	1.38
During high school years	.99	1.05	1.17	.64*	1.35	.92	.62*
Religious affiliation:							
Catholic/Protestant	.97	.92	1.15	.94*	1.41	.87	1.01
Jewish/Protestant	.98	1.13	.98	--	--	--	--
Other/Protestant	1.38*	1.34*	1.38*	1.37	1.47	1.30	1.28
Religiosity:							
High/Moderate	.81*	.74*	.64*	.97	1.56	1.10	.98
Low/Moderate	1.42*	1.54*	1.41*	1.21	.89	1.38	1.44

Note: estimates followed by * are significantly different from 1.0
at the .10 level of probability.

Table 4.4

COMPARISON OF RELATIVE GROSS DROPOUT RATES WITH RELATIVE NET RATES IMPLIED BY THE MULTIVARIATE MODEL, ALL RACES AND SEXES

Variable and Basis for Comparison	Relative Gross Dropout Rates	Relative Net Rates (from Table 4.3)
Father's occupation:		
Low-level/mid-level	1.34	1.20
High-level/mid-level	.62	.96
Mother's occupation:		
Low-level/mid-level	1.45	1.13
High-level/mid-level	.83	.93
Homemaker/mid-level	1.22	1.07
Father's education:		
Additional 4 years	.50	.85
Additional 6 years	.30	.78
Mother's education:		
Additional 4 years	.57	.84
Additional 6 years	.29	.74
Family income:		
Additional $1,000	N.A.	.98
Parents in home:		
mother only/both parents	1.66	1.28
father only/both parents	1.78	1.65
neither/both parents	2.55	2.06
Number of siblings:		
One additional sibling	1.20	1.11
Mother worked:		
Elem years only/no work	1.40	1.36
Elem and H.S./no work	1.10	.99
Religious affiliation:		
Catholic/Protestant	.89	.97
Jewish/Protestant	.68	.98
Other/Protestant	1.63	1.38
Religiousity:		
High/Moderate	.75	.81
Low/Moderate	1.54	1.42

constant. This signifies that such variables as "parents present in the home," "number of siblings," and "mother's work status" do not act merely as proxies for socioeconomic status but have independent effects on dropping out.

Note also that some relationships suggested by the descriptive data do not recur when other factors are controlled. For instance, the multivariate analysis does not confirm that students with parents in high-level occupations (or with homemaker mothers) drop out at lower rates than students with parents in mid-level occupations, nor that Catholic or Jewish students drop out at significantly lower rates than Protestant students. The implication is that the differences found in the descriptive analysis stem from other factors correlated with these aspects of student backgrounds.

Only a few factors can be identified as statistically significant influences on dropout rates in particular race/ethnicity-sex categories. This is particularly true of the minority categories, for which subsample sizes are relatively small. Among whites, the effects of family income and low-level versus mid-level father's occupation are confirmed, as are those of the number of siblings, the mother's working during the student's elementary school years, and the religiosity factor, but the effects of mother's occupation (high- versus mid-level) and both mother's and father's education show up as significant only for female students. For nonwhites, only occasional variables show up as significant for particular groups, and there is little intergroup consistency.

Given the paucity of statistically significant parameter estimates, we are generally unable to determine whether the intergroup differences in dropout patterns observed in the descriptive data hold up when other variables are controlled. Among whites, there is support for the finding that female dropout rates are more sensitive than male dropout rates to parents' educational and occupational levels. Also, female rates are less strongly affected by the absence of one parent from the home. There is also some evidence that black female dropout rates are influenced more strongly than black male dropout rates by SES factors--in fact, no SES factor is found to have a significant effect on the black male rate. Otherwise, small subsample size precludes any definitive statements about interracial differences in the determinants of dropping out.

CONCLUSIONS

Both the multivariate analysis and the simple bivariate comparisons of dropout rates among subgroups demonstrate the importance of socioeconomic and other family background characteristics as determinants of dropping out. Students with the least favorable background characteristics--those with parents in low-level jobs, parents who are relatively uneducated (especially parents who are high school dropouts themselves), who come from one-parent households and large families--are three to five times more at risk of not completing high school than students from advantaged backgrounds. There is some evidence that female dropping out is more sensitive than male dropping out to SES and other background factors and that black male rates are the least sensitive of all. However, many other intersex and interracial differences that show up in gross dropout-rate comparisons are not confirmed by the multivariate results.

The effects of socioeconomic and other background characteristics on dropping out have, of course, been demonstrated in earlier studies (see Chapter I), but certain of the findings reported here are less well established. In particular, the roles of the "parents in home" variables, mother's work status during the elementary and high school years, and the religious affiliation and religiosity variables have received little attention. Also, the interracial differences in relationships of dropping out to particular background variables appear not to have previously been examined in detail. In the latter regard, one of the more important conclusions about interracial differences emerges from the descriptive rather than the multivariate analysis: dropout rates among students with the least favorable background characteristics are no higher among minorities than among whites, implying that it is the differences in socioeconomic and family composition among

race/ethnicity groups, rather than race/ethnicity per se, that account for interracial differences in gross rates of dropping out.

Footnotes:

1. The HS&B questions on father's and mother's occupations offer choices among 16 occupational classifications. For the purpose of this analysis, we grouped the 16 into three broad categories: a "managerial/professional/technical" category comprising the HS&B classes manager/administrator, professional (2 different classifications), teacher, and technical; a "mid-level" category consisting of the clerical, craftsman, farmer, military, proprietor, protective service, and sales classifications; and a "low-level" category made up of the laborer, operative, and service worker classifications.

2. The "homemaker" classification appears in both the father's occupation and mother's occupation items of the HS&B survey, but only a tiny percentage of students (just over 0.1 percent) reported fathers in this category, while 15.8 percent described their mothers as homemakers. Thus, "homemaker" is treated as a separate category for mothers but included in the low-level occupational category for fathers.

3. In the first follow-up survey, students were asked in which third and which eighth of the distribution their families belonged. Only the base-year responses were used in this analysis. Subsequent analyses may use a cleaned, composite measure of family income.

4. The household-possessions component is based on the number of the following items reported as present in the student's household: a daily newspaper, an encyclopedia or reference books, a typewriter, an electric dishwasher, two or more cars that run, more than 50 books, a room of one's own, and a pocket calculator.

5. One possible reason for the lack of a relationship is that SES scores may be especially unreliable for blacks, a possibility that has been noted in the literature (see, e.g., Bielby and Hauser, 1977).

6. These figures are for public schools only and consequently omit a much larger fraction of Catholic high school students than protestants. The gap between Catholic and Protestant dropout rates becomes larger when public and private students are considered together. The combined rates are 10.3 percent for Catholics and 12.9 percent for Protestants; the rates for males are 9.9 and 14.0 percent, respectively, and for females 10.6 and 11.8 percent, respectively. Note that the Catholic female dropout rate is below the Protestant female rate when private schools are included but above it (although not significantly so) when they are not.

7. The descriptive analyses used the HS&B student classifier variable (FUSTTYPE) to define dropouts while the multivariate analyses used the composite status variable (HSDIPLOM) to define dropouts. In addition, the descriptive analyses excluded missing cases while the multivariate analyses used come imputed data. Either of these differences in the descriptive and multivariate analyses may have produced different estimates.

8. The event-history equation for all six race/ethnicity-sex groups combined contains a set of race/ethnicity-sex dummy variables as well as the other independent variables mentioned above.

9. I.e., taking as the base case a student whose parents are both high school graduates in low-level occupations, one would multiply that student's estimated dropout rate by .85 and .84 to represent the effects of both parents' being college graduates and then divide by 1.20 to represent the effect of the father being in a mid-level rather than a low-level job. The calculation is (.85 x .84)/1.20 = .60, which indicates a fall in the dropout rate to 60 percent of its initial value, or a 40 percent reduction.

V. DROPOUT RATES IN RELATION TO LOCATIONAL
AND ECONOMIC FACTORS

There are strong a priori arguments, as well as findings from previous research, to suggest that dropout rates are likely to depend on environmental conditions as well as on the personal background characteristics of students. In this section, we consider two sets of environmental variables: locational factors--namely, geographic region and urban, suburban, or rural location; and local economic conditions, as represented by per capita income, wages, the unemployment rate, and the rate of employment growth. As in the previous chapter, we look first at the descriptive data and then at findings from multivariate models regarding the effects of these variables.

REGIONAL AND URBAN-SUBURBAN-RURAL DIFFERENCES

Gross dropout rates differ substantially both among the major regions of the United States and among high schools located in urban, suburban, and rural places. As shown in Table 5.1, the rates are about one-third higher in the South and West than in the Northeast and North Central regions, about 40 percent higher in urban than suburban places, and slightly higher in rural areas than in suburbs. In addition, there are interaction effects between region and urbanicity. The data in Table 5.2 show that the highest urban dropout rates are found in the regions where overall dropout rates are lowest, namely, the Northwest and North Central states. The differentials between urban and suburban or rural rates are also large and positive in these two regions. In contrast, urban dropout rates in the South are equal to rural rates and only slightly higher than suburban rates, while in the West the urban rates are actually below those in suburban and rural areas. Thus, the relative rate of dropping out in urban centers, which figures so prominently in Table 5.1, turns out to be a regional phenomenon--one characteristic of the Northeast and North Central areas but not the rest of the country.

Interregional differences in dropout rates vary by race/ethnicity and by sex. Whereas white dropout rates are 50 to 60 percent higher in the South and West than in the Northeastern and North Central states, the pattern of black dropout rates is the reverse: 50 to 60 percent higher in the Northeast and North Central regions than in the South and West. This reversal is especially conspicuous for females. Black females in the South and West drop out at significantly lower rates than white females (or any other group), while black females in the Northeast and North Central areas drop out at double the white female rates. Interregional differences in the dropout rates of black males are relatively small--about 25 percent lower in the South and West than elsewhere. What is notable, however, is that while black males in the Northeast and North Central regions have double the dropout rate of whites, black male dropout rates in the South and West exceed the white rates by less than 20 percent. Relative to whites, therefore, blacks fare better in the South and West than in other regions.

Hispanics, overall, exhibit the least interregional variation in dropout rates; however, on closer inspection it turns out that this reflects the lack of variation in rates among Hispanic females. The dropout rates for Hispanic males, like those for whites but unlike those for blacks, are higher in the South and West than in the Northeast and North Central regions.

According to Table 5.1, dropout rates for all groups are higher in the urban centers than in suburban and rural areas. The differences are smaller for males than for females and for white and Hispanic males than for black males. Rural dropout rates are higher than suburban rates for black and Hispanic males but about equal to suburban rates for white males; rural rates are equal to or lower than suburban rates for black and Hispanic females but substantially higher for white females.

It turns out, however, that many of these differences in gross dropout rates cannot be attributed to urban, suburban, or rural location per se (or to characteristics of

urban, suburban, and rural environments) but are due, rather, to differences in the demo-graphic and socioeconomic characteristics of students who live in such places. This will be brought out in the discussion of results from the multivariate analysis, below.

Table 5.1

DROPOUT RATES IN RELATION TO REGION AND URBANICITY,
PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

| Locational or Economic Factor | All | Race/ethnicity and Sex | | | | | |
| | | White | | Black | | Hispanic | |
		Male	Female	Male	Female	Male	Female
All students combined	14.4	13.6	12.5	20.6	14.1	18.9	19.3
Geographic region							
Northeast	11.9	10.8	8.3	24.0	19.5	16.1	20.5
South	16.6	16.9	15.8	18.9	10.7	21.4	18.9
North Central	12.3	10.5	11.2	24.4	22.0	14.1	18.9
West	16.5	18.1	15.0	17.6	9.6	19.6	20.5
Type of place							
Urban	18.1	15.7	15.3	24.4	16.6	20.6	26.2
Suburban	12.8	13.4	10.8	16.3	11.9	17.4	16.9
Rural	14.3	13.0	13.8	19.1	11.9	19.4	15.3

Table 5.2

DROPOUT RATES BY REGION AND URBANICITY, PUBLIC SCHOOL
STUDENTS, ALL RACE/ETHNIC GROUPS AND SEXES COMBINED

| Region | Type of Place | | | All Places |
	Urban	Suburban	Rural	
Northeast	19.8	8.6	11.4	11.9
South	17.3	15.8	17.2	16.6
North Central	19.6	10.3	10.7	12.3
West	14.6	16.9	17.0	16.5
Whole U.S.	18.1	12.8	14.3	14.4

ECONOMIC CONDITIONS

Among the major unresolved questions concerning influences on dropping out are those concerning effects of local economic conditions--especially labor-market conditions--on students' decisions to leave school. We made a special effort, described in Chapter II, to append place-specific economic variables to the HS&B files so that such effects could be investigated. Even so, the data limitations are severe, and most of the variables that should enter, in theory, into an analysis of economic influences on students' decisions to leave school are unavailable. Consequently, we are able to offer only exploratory find-ings on whether the economic environment bears significantly on the rate of dropping out.

According to the prevailing human capital model of demand for education, individuals make their schooling (or nonschooling) decisions in part on the basis of the expected returns to alternative types and amounts of education[1]. Thus, decisions to drop out of high school should be influenced by, among other things, the expected economic benefits and costs of high school completion. More specifically, holding constant such personal factors as family SES and ability, the propensity to drop out should be a function of the expected net returns to graduation, which, in turn, should be negatively related to the expected earnings and the expected availability of jobs for high school graduates and positively related to wage levels and employment prospects in fields open to dropouts. Assuming further that the economic opportunities facing individuals are location-specific (i.e., that individuals are less than perfectly mobile), we would expect dropout rates to vary among localities in relation to differences in local earnings and employment prospects for persons who do and do not complete high school. (Note that such comparisons should take into account the long-term, or lifetime, wage and employment prospects facing dropouts and nondropouts, not just prospects during the period immediately following schooling.)

Unfortunately, data are not available that would allow us to quantify either actual or expected rates of return to high school graduation. In particular, the types of data that have been obtained, or could reasonably have been obtained, for this study do not distinguish between the labor market conditions facing high school graduates and those facing high school dropouts. For example, we do not have separate indicators of local wages in low-skilled and higher-skilled jobs, nor of unemployment rates or job availability in occupations likely to be open to high school dropouts. We are unable, therefore, to construct even proxy measures of geographically specific rates of return to high school graduation. We have only been able to test for relationships between the dropout rate and certain broad indicators of local economic conditions: per capita income, the wage level (in manufacturing), the overall unemployment rate, and the rate of employment growth. This is not equivalent to testing for effects of geographical variations in the economic returns to high school completion, and that is why we deem the exercise only a preliminary examination of economic effects.

Table 5.3 shows how dropout rates vary (by race/ethnicity and sex) in relation to the aforementioned broad indicators of local economic conditions. Specifically, the indicators are (1) county per capita personal income in 1980-81, (2) the average SMSA unemployment rate during 1980-81, (3) the SMSA employment growth rate between 1980 and 1982, and (4) the average SMSA wage level in manufacturing in 1980-81. The SMSA has been chosen as the unit of analysis for the three labor-market variables, unemployment, employment growth, and wage level, because labor-markets are more likely to coincide with SMSAs than with individual counties. That is, an individual who lives or attends school in one county of an SMSA is likely to seek employment throughout the whole metropolitan area, not only within the county of schooling or residence. The county has been chosen as the unit for measuring per capita income because a county-level figure is likely to approximate more closely the per capita income of a student's own community[2]. We have used 1980-81 averages in most cases because most of the dropping out observable from the HS&B survey data took place during that period (i.e., HS&B follow-up survey data were collected early in 1982). In the case of employment growth, however, we measured growth over the two-year 1980-82 period to provide greater stability than could be obtained from growth-rate figures for a single year.

In general, Table 5.3 shows only weak and erratic associations, if any, between dropout rates and the SMSA-level and county-level economic variables[3]. In the case of per capita income, the only clear-cut relationship is that students from counties in the lowest income quartile drop out at a substantially higher rate than students from counties in the top income quartile. Even this result applies only to whites. No systematic relationship is discernible for blacks, and for Hispanics, the relationship actually seems to run in the opposite direction. The SMSA unemployment rate is unrelated to dropout rates of whites, Hispanics, and students in general. Black dropout rates do appear to be

positively related to the unemployment rate, but the multivariate results (discussed below) indicate that this is merely an artifact of the concentration of blacks in certain geographical areas. There is a moderate positive association between the dropout rate and SMSA employment growth, but when specific subgroups are examined, the pattern becomes harder to discern. Although there is a theoretical basis for a positive relationship-- namely, that dropping out to find a job becomes more attractive relative to staying in school when employment is expanding--it is not clear that anything more is evidenced in the table than the geographical distribution of groups likely to drop out. Finally, there is a negative relationship, for males only, between the overall dropout rate and the SMSA manufacturing wage level. The fall-off in dropout rates occurs entirely between the first and second wage-level quartiles; there is no systematic or significant decline thereafter. It is likely that the wage rate, in this case, is serving mainly as a proxy for the level of income in each SMSA, and hence that the negative relationship between wage level and the dropout rate is nothing more than an echo of the negative relationship to per capita income mentioned earlier. All these relationships are shaky, and as will be seen, most do not hold up when the SES and other personal background characteristics of students are statistically controlled.

Table 5.3

DROPOUT RATES IN RELATION TO LOCAL ECONOMIC CONDITIONS, PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

Locational or Economic Factor	All	+------- Race/ethnicity and Sex -------+					
		White		Black		Hispanic	
		Male	Female	Male	Female	Male	Female
County per capita income							
First (lowest) quartile	16.2	15.8	15.6	20.9	14.7	17.8	14.1
Second quartile	13.4	13.5	11.9	20.3	7.8	15.6	19.1
Third quartile	15.7	14.0	14.0	22.5	14.7	22.3	23.6
Fourth (highest) quartile	12.7	11.8	9.6	19.0	15.3	18.6	19.6
SMSA unemployment rate							
First (lowest) quartile	14.6	13.8	13.7	18.3	7.0	17.8	24.1
Second quartile	14.2	13.2	12.0	21.5	15.9	18.8	16.7
Third quartile	13.2	14.0	9.2	20.1	14.4	19.9	17.8
Fourth (highest) quartile	15.7	13.3	15.3	22.2	18.9	18.9	19.6
SMSA Employment growth rate							
First (lowest) quartile	13.5	13.2	12.9	17.9	10.2	18.6	17.0
Second quartile	14.0	11.2	11.1	23.6	20.4	19.4	13.7
Third quartile	13.4	13.2	11.1	24.1	14.2	14.3	17.5
Fourth (highest) quartile	16.6	16.7	14.8	17.0	10.2	21.1	22.0
SMSA manufacturing wage level							
First (lowest) quartile	16.4	16.5	12.8	23.4	14.4	21.0	13.9
Second quartile	13.6	13.5	12.2	17.6	10.5	17.5	19.1
Third quartile	13.2	10.8	12.3	19.7	14.9	19.0	20.4
Fourth (highest) quartile	14.3	13.9	12.9	18.6	18.4	16.9	19.5

FINDINGS FROM THE MULTIVARIATE ANALYSIS

Using the previously described event-history methodology, we conducted a multivariate analysis of the effects of locational and economic variables on the dropout rate, holding student characteristics constant. The multivariate model is the same as that cited in Chapter IV--that is, a model in which the explanatory variables include region, urbanicity, local economic conditions, socioeconomic status variables, and the other family background variables analyzed earlier. We experimented with alternative forms of this model, allowing for different combinations of, and interactions among, the locational and economic factors. The results shown below (Table 5.4) are from the final, stripped down version, from which statistically insignificant variables have been deleted. As before, the table entries are dropout-rate ratios, representing the multiplicative factors by which the dropout rates change in response to the specified changes in the explanatory variables. Estimates are presented for the six separate race/ethnic and sex categories and for all groups combined.

The results in Table 5.4 corroborate some, but by no means all, of the regional and urbanicity effects detected in the descriptive analysis. The figures show that dropout rates tend to be higher, other things being equal, in the South and West than in the other regions (Northeast and North Central) and higher also in urban places than in suburban and rural places. But they show also that the urban effect is regional rather than national, applying in the Northeast and Northcentral states but almost "washing out" in the West and South. To illustrate, the entries in the first column of the table--for all race/ethnic groups and sexes combined--show that estimated dropout rates in the nonurban South and West (holding personal characteristics constant) are about 1.6 times as great as rates in the nonurban Northeastern and North Central regions; urban dropout rates are about 1.8 times as great as nonurban rates in the latter two regions; but urban dropout rates in the South and West are only 1.1 and 1.2 times greater, respectively, than the nonurban rates in those regions. (The latter ratios are obtained by multiplying the national urban factor, 1.76, by the region-urban interaction factors, .63 and .70 for the South and West, respectively). Differences between the Northeast and Northcentral regions and between rural and suburban areas proved insignificant (disparities in gross dropout rates notwithstanding) and are not reflected in the table.

The interracial disparities in regional dropout patterns detected in the descriptive data analysis generally are detectable only in dilute form, if at all, when SES and other background characteristics of students are held constant. In particular, the aforementioned sharp reversal in gross dropout-rate patterns, wherein black females, contrary to white females, drop out at much lower rates in the South and West than elsewhere, is not confirmed by the multivariate results. Unlike white females, black females, according to Table 5.4, do not drop out at higher rates in the South and West than elsewhere but neither do they drop out at significantly lower rates. The event history estimates do confirm, however, that being located in a northern urban area has a stronger positive effect on the black male dropout rate than on the rates for other groups. According to the multivariate model, urban black males in the Northeast and North Central regions are nearly three times as likely not to complete school as one would infer from personal and family background characteristics alone.

The multivariate analysis provides even less evidence than the descriptive analysis of effects of local economic conditions on the dropout rate. Three of the four economic indicators treated in the descriptive data analysis, the SMSA unemployment rate, the manufacturing wage level, and per capita income were found to have no statistically significant effects in any version of the model or for any group. The final economic variable, the SMSA employment growth rate, has no statistically significant relationship to the dropout rate for students in general but does have a strong negative association with the rate for black males in particular. That is, black males are estimated to drop out at only a small fraction of their average rate in SMSAs where the employment growth rate is high. We have no explanation for this seemingly anomalous estimate.

Table 5.4

ESTIMATED EFFECTS OF SELECTED LOCATIONAL AND ECONOMIC
VARIABLES ON RELATIVE DROPOUT RATES,
PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

Variable and Basis for Comparison	All	White[a] Male	White[a] Female	Black Male	Black Female	Hispanic Male	Hispanic Female
Geographic region[b]							
South	1.63*	1.72*	1.62*	1.53	1.04	1.68	1.41
West	1.57*	1.58*	1.77*	1.63	.63	1.58	1.10
Urbanicity[c]							
Urban	1.76*	1.66*	1.44*	2.95*	1.56	1.00	1.03
Region-urban interaction[d]							
Urban-South	.63*	.84	.91	.39*	.57	.61	1.24
Urban-West	.70*	.88	.77	.38*	.52	.93	1.26
Economic factors							
County per capita income (additional $1,000)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SMSA employment growth rate (additional percentage point)	.70	1.03	.72	.05*	1.06	1.68	.95*

Note: Estimates followed by * are significantly different from
    1.00 at least at the .10 level of probability.
[a]There is no white total model described in this table. The
separate models for white males and white females should not be
compared or consolidated.
[b]The basis of comparison for the regional dummy variables is the
average dropout rate in the combined Northeast and North Central
regions.
[c]The basis of comparison for the urban dummy variable is the
average dropout rate in suburban and rural places.
[d]The basis of comparison for the interaction terms is the average
dropout rate in nonurban places in the Northeast and North Central
regions.

CONCLUSIONS

The multivariate analysis confirms that there are locational variations in dropout
rates, over and above those that can be accounted for by interarea differences in the per-
sonal and family backgrounds of students. Other things being equal, dropout rates are
generally higher in the South and West than in the Northeastern and North Central regions
and higher in urban than in rural or suburban places. However, the locational effects are
not the same for all groups. White females drop out at significantly higher rates in the
South and West, while black females do not. Being located in an urban area increases the
probability of dropping out only modestly in the South and West but more sharply in the
Northeastern and North Central states. In particular, black males in northern urban cen-
ters are at an especially high risk of not completing school.

Neither the descriptive nor the multivariate analysis indicates a systematic relationship between local economic conditions and dropping out. However, the analysis is inconclusive because of the limitations of the data. The available indicators do not reflect interarea differentials in the relative economic opportunities available to high school graduates and high school dropouts and do not provide even rough indicators of local differentials in rates of return to high school graduation. Consequently, we have not been able to test the human capital hypothesis that dropout rates should vary according to the expected economic returns to completing school. A definitive test would require much more detailed information on relative wages and employment opportunities in different occupations and/or for workers at different age, experience, and skill levels.

Footnotes:

1. The classic human capital reference is Becker (1975). An article that applies human capital theory specifically to dropouts is Hill (1979).

2. Note that the county whose characteristics are associated with each student is that in which the student last attended high school. This is not necessarily the same as the county in which the student attended school at the time of the HS&B base-year survey, nor is it necessarily the same as the student's county of residence at the time of either the base-year or the follow-up survey. Note also that students whose schools are not located in SMSAs have been assigned labor-market characteristics equal to the statewide averages for all non-SMSA counties.

3. For the purpose of this analysis, counties or SMSAs were grouped into quartiles according to their rankings on each of the economic variables in question. Only the 900 or so counties represented in the HS&B data base (those containing HS&B sample schools) were considered in defining these quartiles. Thus, the counties assigned to a particular quartile in this analysis would not necessarily fall into the same quartile if all 3,100 counties in the nation were considered.

VI. DROPOUT RATES IN RELATION TO EDUCATIONAL EXPERIENCES AND SCHOOL FACTORS

The relationships of school factors and educational experiences to dropping out are matters of intense policy interest. Attributes of schools, unlike many other influences on dropping out, may be susceptible to direct manipulation by education authorities. Thus, if certain characteristics of schools were shown to encourage or discourage dropping out, policies could be changed to make the favorable conditions more prevalent. Educational experience factors, such as student progress and performance, are not directly manipulable, but knowing how they relate to the dropout rate can help authorities to identify students at risk and to target dropout prevention efforts. In this chapter, we focus first on the performance and progress indicators and then on selected attributes of schools.

EDUCATIONAL PROGRESS AND PERFORMANCE INDICATORS AS PREDICTORS OF DROPPING OUT

It is hardly surprising that indicators of educational progress and performance are associated with dropping out, but the strength of the relationship is impressive. Moreover, that the dropout rate is highly correlated with HS&B base-year (sophomore) performance indicators suggests the potential usefulness of such indicators to provide early warning of youth at risk of not completing school. Table 6.1 presents the descriptive data pertaining to two performance indicators, scores on the HS&B battery of "ability" tests and self-reported high school grades, and two indicators of progress through school, whether a student was held back or repeated a grade and the student's age at the beginning of the 9th grade. As in the previous descriptive data tables, we show the dropout rates associated with different values of these variables for all students combined and for students classified by race/ethnicity and sex.

Before discussing the results, a cautionary note is in order: These performance and progress variables obviously cannot be interpreted as independent or exogenous influences on dropping out. Poor performance and slow progress through school are not "causes" of dropping out but rather consequences of the same underlying forces as are responsible for dropping out. Thus, relationships to performance and progress cannot be cited to "explain" dropping out; but since performance and progress are measurable before dropping out occurs, they can be used to predict dropping out and to identify students at special risk.

Indicators of Student Performance

HS&B provides an assortment of performance indicators, including scores on the special HS&B reading, vocabulary, mathematics, and other subject-area tests, which were administered in conjunction with the base-year and follow-up surveys. Table 6.1 relates dropout rates to two such indicators, the student's "ability" quartile (a composite of base-year and follow-up test scores) and the student's self-reported high school grades.

As one would expect, the dropout rate falls off rapidly as test scores increase. The dropout rate in the lowest ability quartile is 26.5 percent for all race/ethnic groups and sexes combined and above 20 percent for each separate race/ethnicity-sex group; in the highest ability quartile it is only 3.2 percent for all groups combined and below 5 percent for all groups except black males. Thus, students in the lowest ability stratum are eight times more likely to drop out, on average, than are students who score in the highest ability quartile.

The relationship of dropping out to self-reported high school grades is even stronger. The probability of dropping out is minuscule (1.4 percent) for those who report earning mainly A's; modest (6.7 percent) for those who earn A's and B's or mainly B's; about average for those who receive B's and C's or mainly C's; and sharply higher for

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recipients of C's and D's or worse. Among students in the lowest grade bracket, less than
D's, it is an exceptional achievement to earn a high school diploma.

Table 6.1

DROPOUT RATES IN RELATION TO SCHOOL PERFORMANCE, PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

Performance Indicator	All	White Male	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
All students combined	14.4	13.6	12.5	20.6	14.1	18.9	19.3
Ability test score							
First (lowest) quartile	26.5	30.6	28.2	27.9	20.1	26.1	23.8
Second quartile	14.7	16.6	16.3	11.7	3.2	11.4	11.0
Third quartile	7.8	8.8	6.6	8.7	5.4	6.6	15.0
Fourth (highest) quartile	3.2	3.8	2.4	8.3	4.6	2.4	4.4
High school grades							
Less than D's	82.9	84.1	87.9	68.3	87.9	83.6	78.7
C's and D's	35.4	32.9	42.2	33.3	28.3	29.7	46.6
B's and C's	14.3	12.9	14.7	17.7	12.4	16.4	14.8
A's and B's	6.7	4.0	6.9	12.5	9.9	10.4	11.9
Mostly A's	1.4	1.5	1.0	0.8	4.7	3.7	1.0
Held back or repeated a grade?							
Yes	27.2	26.8	27.8	33.2	22.5	25.7	26.9
No	12.4	11.4	10.9	17.9	12.8	17.7	18.4
Age at start of 9th grade							
15-1/2 or older	42.1	42.6	43.9	48.6	48.4	32.6	42.3
15 or 15-1/4	23.7	21.8	24.9	29.1	21.9	24.4	25.4
14-3/4	13.2	11.9	13.8	19.1	8.4	16.8	12.2
14-1/2	11.8	11.2	10.5	16.0	9.8	17.3	17.8
14-1/4	9.9	8.8	9.8	11.6	9.8	12.9	12.2
14	8.5	7.4	7.9	7.6	8.5	11.8	17.8
Under 14	9.0	12.1	8.0	4.3	6.1	10.6	10.8

Once again, there are some intergroup variations in patterns. The steepness of the decline in the dropout rate with increasing ability is generally greater for females than for males (although this does not hold for Hispanics). Specifically, female dropout rates, while lower than male rates at all ability levels, are relatively more so in the higher ability quartiles. The association between low grades and dropping out is evidenced in the data for both sexes, but there is an interesting difference between the male and female patterns: in all grade categories except the highest ("mostly A's"), females drop out more frequently than males. This means that the overall male dropout rate is higher than the female rate not because males with given grades are more likely to drop out but because of the higher concentrations of females than males in the higher grade brackets[2].

There are also some interracial differences in the relationships of dropping out to test scores and grades. Whereas white and Hispanic dropout rates are lower in each successively higher "ability" quartile, the improvement for blacks occurs mainly between the first and second quartiles. For black females, in particular, dropout rates are more or less uniformly low from the second quartile on. For black males, being in the top ability quartile is not associated with the low dropout rates found among high-ability members of other groups. The relationship between grades and dropping out is strong for all race/ethnicity groups but somewhat less so for minorities than for whites. In particular, dropout rates fall off more rapidly for whites than for other groups in the two highest grade brackets[3]. Perhaps the most interesting aspect of the interracial comparison, however, is that in the three lowest ability quartiles, whites drop out at higher rates than blacks. The higher overall dropout rate for blacks than for whites is due primarily, therefore, not to higher dropout rates for blacks than for whites of comparable ability but rather to the low representation of blacks in the higher ability strata.

Indicators of Progression through School

Table 6.1 also demonstrates a strong relationship between dropping out and failing to progress through the pre-high school grades at a normal rate. The dropout rate is more than twice as high among the 14 percent of students who have been held back or repeated a grade as among the remaining 86 percent of students who have not. This ratio is about the same for males as for females, but it is higher for whites than for blacks and higher for blacks than for Hispanics. That is, the sensitivity of the dropout rate to repeating a grade is greatest for whites, next greatest for blacks, and lowest for Hispanics.

Similarly, entering high school at a higher-than-normal age is associated with a high probability of dropping out. The typical age of entry to 9th grade is 14 to 15. Compared with students who are 14-1/2 when they enter, those in the 15 to 15-1/4 age range are twice as likely, and those 15-1/2 and older more than three times as likely, to drop out. This pattern holds for both sexes and for whites, blacks, and Hispanics, although less strongly for Hispanics than for the other groups.

Although the earlier cautionary remark about "correlation, not causation" applies to indicators of grade progression as well as indicators of academic performance, its force is diminished in the former instance by the timing of grade retention. That is, since most such retention takes place in the elementary grades, having been retained is a condition that students bring with them to high school. Unlike low test scores, it cannot be labeled a concommitant outcome, along with dropping out, of influences operating during the student's high school years. Although this still leaves room for "underlying" determinants of both early grade retention and later dropping out, it suggests that grade retention has a more nearly independent status than performance as a determinant of failure to complete school.

SCHOOL FACTORS

Although there is great interest in school factors that contribute to or deter dropping out, we have been able only to skim the surface of that subject. The HS&B surveys provide data on relatively few of the potentially relevant school factors. Among the important missing items are quality-related characteristics of teachers, such as teachers' educational backgrounds, experience, and verbal and other abilities; data on the instructional processes in different high schools (e.g., data on "time on task"); and data on attributes of "school climate" of the type cited in the recent "effective schools" literature[4]. HS&B does provide some information on school offerings, such as indications of whether particular special programs are available in each school. However, it is very difficult to analyze the effects of program offerings on dropping out because of self-selection and simultaneity problems, and doing so would require additional data--e.g., on

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the severity of individual student's special needs--that are not included in the HS&B files[5].

We have been able to analyze relationships of dropping out to these school factors: teacher-pupil ratio, school size (enrollment), composition of the student body (specifically, the percentages of enrollment that are black and disadvantaged), the teacher turnover rate, and whether a competency test is required for graduation. In addition, because of the considerable policy interest in the issue, we present data on the relationship between the program in which a student is enrolled--academic, vocational, or general--and the frequency of dropping out. Table 6.2 presents descriptive data on the relationships of dropout rates to some of these variables; the remaining variables are not included in the gross dropout-rate comparisons but do figure in the multivariate analysis.

Relationships of School Factors to Gross Dropout Rates

Teacher-Pupil Ratio. The principal indicator available from HS&B of the instructional resources applied to each student is the number of teachers per pupil in average daily membership (ADM). Schools have been grouped into quartiles according to this variable and the dropout rates for each quartile are shown in Table 6.2. As can be seen, the dropout rate declines moderately as the teacher/pupil ratio increases. Dropout rates among schools in the highest teacher/pupil quartile are less than two-thirds as great as those of schools in the lowest quartile. It does not necessarily follow, however, that low dropout rates are due to high teacher/pupil ratios or that raising the ratios would cause the rates to fall. An alternative explanation is that schools with high staffing ratios tend to have other characteristics associated with low dropout rates, such as higher income and SES[6]. Whether the teacher/pupil ratio has an independent effect can be determined only when such other factors are controlled.

Percent of Enrollment Black. The make-up of the student body is a factor that may affect various dimensions of performance, including the dropout rate (this is the well-known "peer effect" on performance). One frequently used indicator of school composition is the percentage of enrollment black. (A preferable alternative indicator, the average SES level of the students in the school, is not available in the HS&B data.) Table 6.2 shows how dropout rates vary as the percentage black increases.

Although the overall relationship is positive--the dropout rate increases with the percentage of enrollment black--the pattern varies by race/ethnicity and sex. It is stronger for females (blacks included) than for males. Among white males, the only clear-cut effect is the lower dropout rate in the less-than-10-percent black schools than in the other categories. The black male group is the only one for which no pattern at all is discernible[7]. One might expect that the percentage of enrollment black would be a proxy for concentrations of low-income, low-SES students and consequently would be strongly and positively associated with the dropout rate. That this does not occur is an indication that the relationship between race/ethnicity and the SES factors is a complex one and that a careful multivariate analysis is needed to disentangle it.

Competency Testing. An issue of special current interest is the effect on educational outcomes, including the dropout rate, of requiring students to pass a competency test to graduate. Both the base-year and follow-up HS&B school surveys asked whether such a requirement was in effect. The dropout rates associated with "yes" and "no" responses in the follow-up year are shown in the table. The overall dropout rate is higher by a small amount among students who attended high schools that required competency tests but significantly so only for white males and Hispanics. Even for the latter groups, however, it is incorrect to infer that imposing a competency test requirement causes students to drop out, since schools with and without such requirements may differ in other attributes related to dropping out as well. In fact, as will be seen below, the competency test effect vanishes when student backgrounds and other factors are taken into account.

High School Program. Considerable interest has been expressed in how the student's choice of, or assignment to, a particular high school program affects educational

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outcomes, including dropping out. In particular, there has been debate over whether enrollment in a vocational education program increases or diminishes the likelihood of dropping out. According to the last set of entries in Table 6.2, students who report that they were enrolled in vocational programs in their sophomore years drop out at more than three times the rate of students who were enrolled in academic programs and at a slightly higher rate than students enrolled in general programs[8]. The same pattern holds for males and females and for blacks and whites but not for Hispanics, for whom the interprogram differences are considerably smaller.

Table 6.2

DROPOUT RATES IN RELATION TO SCHOOL AND PROGRAM CHARACTERISTICS, PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX
(Dropout Rates in Percent)

School or Program Characteristic	All	White Male	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
All students combined	14.4	13.6	12.5	20.6	14.1	18.9	19.3
Teacher-pupil ratio							
First (lowest) quartile	15.5	14.7	13.6	23.3	13.5	21.4	20.0
Second quartile	13.8	12.8	11.4	19.4	15.5	17.1	20.1
Third quartile	13.0	12.8	11.3	19.8	14.9	13.0	14.4
Fourth (highest) quartile	8.9	7.7	10.2	a	a	a	a
Percent of H.S. enrollment black							
Less than 10 percent	12.8	12.7	11.4	22.0	11.7	16.7	17.9
10-30 percent	15.3	16.1	13.1	18.8	12.3	19.6	20.6
30-50 percent	18.1	14.5	21.6	14.9	15.6	28.5	19.1
50 percent or more	19.7	14.3	22.5	24.3	15.1	20.8	25.1
Competency test required for graduation?							
Yes	15.8	15.4	13.1	21.1	13.1	21.4	21.4
No	13.8	13.0	12.5	20.4	12.5	16.8	17.6
High school program (base year)							
Academic	5.8	5.4	4.3	7.7	6.7	15.0	14.4
Vocational	19.7	20.0	15.6	28.3	19.3	22.4	19.4
General	16.6	14.9	17.0	22.1	14.3	17.2	19.9

[a]Sample size too small to estimate a dropout rate.

But confirming that vocational students are more likely than academic students to drop out does nothing to resolve the long-running debate over the effect of vocational education on school completion. It has been argued that students with little ability or interest in academic work would drop out at even higher rates if the vocational option were not available. It is not possible to confirm or refute this contention without an

analysis that allows explicitly for assignment or self-selection of students into the various programs--a task beyond the scope of the present study.

Findings from the Multivariate Analysis

To examine the net effects of school factors on dropping out, we estimated multivariate event history equations in which the independent variables include the aforementioned school variables, the personal and family background characteristics of students and the locational and economic variables. The estimates of the effects of school factors are shown in Table 6.3. Again, as in previous tables of this type, the table entries are dropout-rate ratios, or relative dropout rates. For example, the entries under "teacher-pupil ratio" represent the factors by which dropout rates are reduced in response to each unit increment in the number of teachers per 1,000 pupils.

Table 6.3

ESTIMATED EFFECTS OF SELECTED SCHOOL CHARACTERISTICS ON RELATIVE DROPOUT RATES, PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

| Variable and Basis for Comparison | All | Race/ethnicity and Sex | | | | | |
| | | White | | Black | | Hispanic | |
		Male	Female	Male	Female	Male	Female
Teacher-pupil ratio (each additional teacher per 1,000 pupils)	.78	.87	.74	.02*	8.8	.04*	16.00
Percentage of students black (each additional percentage point)	1.00	1.00	1.00	.99	.99	1.00	1.00
Percentage of students disadvantaged (each additional percentage point)	1.00	1.00	1.00	1.01	1.01*	1.00	1.00
Teacher turnover rate (each additional percentage point)	1.01*	1.01	1.01	1.02	1.01	.57	1.00
High school size (each additional 1,000 students enrolled)	1.18*	1.31*	1.25*	.97	.96	1.17	1.42
Minimum competency test required?[a]							
Yes, both 1980 and 1982	.91	.93	.92	.86	.87	.94	.83
Change from 1980 to 1982	.89	.96	.87	.68	.89	.88	1.24

Note: Estimates followed by * are significantly different from 1.0 at least at the .10 level of probability.

[a]The presence of a minimum competency test requirement is represented by two dummy variables. The first indicates whether there was a requirement in both the HS&B base year and the follow-up year; the second indicates whether there was a change in the requirement between the two years (a "yes" to the latter generally signifies that a requirement was added between the base year and the follow-up year).

In general, even the weak relationships detected in the descriptive analysis are not confirmed when one controls for nonschool factors. The estimated coefficients (ratios) for the teacher-pupil ratio, although less than one, are not significantly so, failing to support the finding that a higher staffing ratio reduces dropping out. Neither the percentage of students black nor the percentage classified as disadvantaged is associated with any difference in the dropout rate. Requiring a minimum competency test for graduation, which was found to be associated with a higher dropout rate in the descriptive analysis, is associated with a lower rate when other factors are held constant, but the estimated coefficients are not significantly different from 1.0.

The only two variables that show any significant effects on the overall dropout rate are teacher turnover and high school size. A higher teacher turnover rate is associated with a higher rate of dropping out, as one might expect, but the estimated dropout-rate ratio is only 1.01, indicating a one-percent increment in the dropout rate for each one-percent increment in turnover. Larger school size is associated with substantially higher dropping out--for example, an estimated 18-percent higher rate in high schools with 2,000 pupils than in high schools with 1,000 pupils. However, it may well be that the school size factor is serving as a proxy for characteristics other than size per se (possibly including characteristics of the student body) that are more frequently found in larger high schools.

There are a few anomalous results in the equations for particular groups of students, notably the extremely low and highly significant coefficients of the teacher-pupil ratio variable in the equations for black and Hispanic males. Taken literally, these would imply that increases in the teacher-pupil ratio could reduce dropout rates for these groups to a tiny fraction of their actual values, but almost certainly, these extreme coefficients reflect other differences between high-teacher-pupil-ratio and low-teacher-pupil-ratio schools than serve blacks and Hispanics.

CONCLUSIONS

We have found little evidence that school variables affect dropout rates. Of the variables we tested, only school size (enrollment) and the teacher turnover rate show significant effects in a multivariate model with personal and other background factors controlled. However, many important school factors were not represented in our data set, and it would be incorrect to infer from our limited analysis that school attributes are not important determinants of the dropout rate. In particular, we believe that the effects of teacher attributes, characteristics of the instructional process, and "school climate" all need to be brought into the analysis before conclusions are reached about the potential effects of educational treatments on the incidence of dropping out.

We have shown that dropout rates are strongly related to indicators of educational performance and progress through school, and we believe that this information can be put to practical use. The fact that impaired progress at an early stage in the school career (e.g., repeating a year in elementary school) correlates strongly with dropping out suggests that it may be feasible to develop early warning systems for identifying children at risk of not completing school. (It is likely that pre-high school grades and test scores would also correlate strongly with dropping out, although we were only able to confirm the relationship to high school grades and test scores with the HS&B data.) A logical next step would be to determine which combinations of personal, performance, and progress indicators best predict dropping out, so that practical methods of targeting dropout prevention efforts can be established.

Footnotes:

1. "Ability" is the label attached by NORC to a composite of performance scores on reading, vocabulary, and mathematics tests. The ability score reflected in Table 6.1 is an equal-weighted average of the standardized scores on these tests in both the base year and follow-up year--i.e., an average of six test scores (or as many are nonmissing) for each student. The high school grades shown in Table 6.1 are those reported in response to the question, "Which of the following best describes your grades so far in high school? Mostly A (a numerical average of 90-100); about half A and half B (85-89); Mostly B (80-84) ...." (Responses have been consolidated--e.g., by combining "half A and half B" with "mostly B" to reduce the number of entries in the table.)

2. To be specific, 48.9 percent of female students report themselves in the A or A/B categories, as compared with only 34.9 percent of males.

3. The dropout rate is extremely low among black males with "mostly A's," but there are very few observations in this category and the estimate is unreliable.

4. For reviews of this literature and summaries of findings, see Cohen (1983) and Purkey and Smith (1983).

5. For example, the availability of a bilingual program in a high school appears to be positively related to that school's dropout rate in a simple cross-tabulation or correlation analysis, not because such programs induce students to drop out but because they tend to be offered in schools where limited-English-proficient (LEP) students are concentrated and hence where the dropout great is likely to be relatively high. Thus, to arrive at a reasonable assessment of the effect of a bilingual program on the dropout rate, one must be able to control for the LEP concentration in each school. Moreover, even within a school, participants in a bilingual program may be found to drop out at higher rates than nonparticipating LEP students--again, not because the program causes dropping out but because students with the most severe problems are likely to be selected as participants. To avoid biased and misleading estimates of program effects on dropping out, one would have to model the selection or self-selection process itself, but that is a very difficult task and far beyond the scope of the present study.

6. Because the teacher/pupil ratio quartiles have been defined for schools rather than pupils, and without weighting for the number of pupils in each school, the higher quartiles contain relatively few pupils and probably consist in large part of small high schools. A different picture might be obtained from a breakdown based on pupils rather than schools.

7. The apparent U-shaped pattern for black males--higher dropout rates in schools with the lowest and highest percentages black--is suggestive, but the number of black males in the less-than-10-percent black schools is too small to establish that such a pattern actually exists.

8. The differences in dropout rates become much larger when students are classified according to the program in which they were enrolled in their senior years (or, in the case of dropouts, at the time they last attended school). According to the senior-year classification, the rates are 3.4 percent, 21.7 percent, and 15.9 percent, respectively, for students in the academic, general, and vocational programs. Note that seniors in the general program are more likely to drop out than seniors in the vocational program, reversing the order among those enrolled in general and vocational programs in their sophomore year. This suggests that by the senior year the general program has become a refuge for students with no particular educational goals and hence with high probabilities of dropping out.

VII. DROPPING OUT IN RELATION TO OTHER STUDENT BEHAVIORS AND CHOICES

In this chapter we examine the relationships between dropout rates and selected indicators of students' social behaviors and choices:

o   Whether the student worked for pay while in high school and, if so, for how many hours per week;

o   Whether the student married, had a child, or both; and

o   Whether the student had disciplinary problems in school or trouble with the law.

These variables, like the educational performance variables considered in Chapter VI, are obviously all endogenous and cannot be construed as independent causes of failure to complete school. Almost surely, they are influenced by the same underlying factors as influence the dropout rate itself. Again, however, the behaviors in question, like low school performance, can serve as early warning indicators of danger of dropping out.

RELATIONSHIPS TO GROSS DROPOUT RATES

The relationships of these behavioral variables to gross dropout rates are shown in Table 7.1. Once again, results are presented for the six race/ethnic-sex groups and for all groups combined. The principal findings concerning the individual behavioral variables are as follows:

Working While in School

Whether working while in high school adversely affects educational outcomes, including dropping out, is a question of recurring policy interest. The first set of entries in Table 7.1 demonstrates that students who work generally drop out at higher rates than students who do not. However, when the data are disaggregated by sex and race/ethnicity, it becomes clear that more than a clear-cut positive effect is involved. The relationship between working and dropping out, though significantly positive for all males and for black females, is negative for white and Hispanic females. In part, the reversal may stem from differences in the numbers of hours worked per week, on average, by males and females. This point is taken up below. In addition, one can speculate that work for pay may have a different meaning for males than for females: for the former, it may often be viewed as an alternative to schooling, while for the latter it may sometimes signify career orientation--an attitude presumably negatively related to dropping out. To go beyond speculation, however, would require a more detailed analysis of the characteristics of males and females who work while attending school.

The second set of table entries shows that the dropout rate for students who work is generally higher among those who work more hours per week. Taking all race/ethnic groups and sexes together, students who report working 1 to 14 hours per week drop out at no higher a rate than students who do not work at all, whereas the rate is about 50 percent higher for those who work 15 to 21 hours per week and 100 percent higher for those who work 22 hours per week or more. Both males and females are more likely to drop out if they work longer hours, but the percentage of working females who work long hours (15 or more hours per week) is much smaller than the corresponding percentage of working males[1]. Consequently, the hours-worked factor alone may account for much of the male-female difference in the relationship between working for pay and dropping out. (That factor cannot explain, however, why males who work 1 to 14 hours per week drop out more frequently than

males who do not work, while females in the 1-14 hour per week group drop out at lower rates than nonworking females.)

Table 7.1

DROPOUT RATES IN RELATION TO STUDENT BEHAVIORS AND CHOICES,
PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

Behavioral Indicator	Race/ethnicity and Sex						
	All	White Male	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
All students combined	14.4	13.6	12.5	20.6	14.1	18.9	19.3
Worked for pay while in school?							
Yes	15.7	16.9	11.1	27.5	16.6	21.8	18.5
No	13.3	10.6	13.7	16.9	12.7	16.2	19.6
Hours worked per week							
22 or more	22.5	20.7	23.6	29.5	14.0	26.2	22.1
15 - 21	17.6	13.4	20.5	18.5	9.6	22.9	33.3
1 - 14	11.1	10.5	9.1	18.6	15.6	13.5	16.1
None	11.5	9.4	10.7	13.5	11.8	18.9	19.3
Marital and parenting status							
Married, with children	74.8	69.9	75.7	a	a	a	70.9
Unmarried, children	45.3	37.4	61.1	a	39.6	a	72.0
Married, no children	59.3	55.5	59.5	a	a	a	52.7
Unmarried, no children	11.2	12.6	7.3	21.8	9.4	18.4	10.4
Antisocial behavior							
Disciplinary problems?							
Yes	28.0	27.8	27.5	30.9	24.3	26.9	33.4
No	10.0	8.6	9.7	13.5	10.0	14.7	13.7
Suspended or probation?							
Yes	32.7	31.3	35.4	36.1	25.9	29.4	38.6
No	10.7	9.6	9.9	13.2	11.3	15.2	15.2
Serious trouble with law?							
Yes	32.6	31.0	27.1	52.6	29.5	34.6	35.9
No	13.4	11.7	12.2	19.7	14.3	18.0	18.7

aSample size too small to estimate a dropout rate.

The relationship between weekly hours worked and the dropout rate varies somewhat among groups. It is most pronounced among white females and nonexistent among black females, with the other groups falling in between. For black males, dropout rates differ significantly only between those who work more or fewer than 22 hours per week; for Hispanic males, 15 hours per week is the relevant dividing line. There also appear to be intergroup differences in the effect of working a moderate amount versus not working at all. For whites and Hispanics, there are only small and generally insignificant differences in dropout rates between those who report 1 to 14 hours of work per week and those who report

none. For blacks, however, or at least black males, any amount of work seems to be associated with a higher dropout rate.

Marriage and Childbearing

There has been much concern recently with the consequences of teenage sexual activity, pregnancy, parenting, and household formation, specifically including the effects of those behaviors on continuation in school. The HS&B data do not cover sexual activity or pregnancy but do allow us to look at the association between marriage and childbearing and the frequency of dropping out.

The "marital and parenting status" entries in Table 7.1 show that dropout rates are dramatically higher among students who reported being married, having children, or both at the time of the first follow-up survey than among the rest of the student population. Married students, male and female alike, drop out at nearly a 60 percent rate; females and males with children drop out at rates of about 50 and 30 percent, respectively; and those who are both married and have children drop out at an extraordinary 75 percent rate. Although fewer than 5 percent of respondents report that they either are married or have children, those who say "yes" to either question leave school at such a high rate that they account for over 22 percent of all dropouts. Of all the female dropouts in the HS&B sample, over 40 percent said they were married or had children at the time of the follow-up survey.

The numbers of married respondents and respondents with children are too small, unfortunately, to permit an analysis of racial differences in the association of these characteristics with dropping out. There is an indication that black females who are not married but have children are less likely to leave school than are white females in the same situation, but there are too few cases for that difference to be statistically significant. It appears that a more specialized survey, aimed specifically at marriage, childbearing, and related issues, would be needed to obtain sufficiently detailed data on this subject.

Unfortunately, also, the HS&B survey provides no information on the closely related question of how pregnancy affects the dropout rate. This is an issue with important policy implications for pregnancy prevention efforts and services to pregnant or parenting adolescents. We understand that proposals to include questions about pregnancy and sexual behavior in the HS&B surveys were rejected, but that there is a possibility of collecting such information retrospectively in future HS&B follow-ups. If so, this information would help to fill a significant gap in our present understanding of influences on dropping out.

The cautionary notice about drawing causal inferences may bear repeating in the specific context of the marriage and childbearing variables. Getting married and having children, like many of the other variables discussed in this and previous sections, are endogenous variables, likely to be influenced by many of the same personal and environmental characteristics as affect educational outcomes, including dropping out. To some students, leaving school to form a household may seem a reasonable alternative to remaining in an unrewarding school environment; for others, marriage and childbearing may follow the decision to drop out. In such cases, it cannot be said that marriage or childbirth "caused" the student to leave school. It would be no less plausible (but equally incomplete) to claim the opposite. Whether interventions aimed specifically at pregnancy or parenting, or at students' decisions to marry before graduation, might reduce the dropout rate is an entirely different question, not addressable with the present HS&B data. Nevertheless, it is clear that for students still attending high school, getting married or having a child is one of the strongest possible signals that dropping out may be imminent.

Antisocial Behaviors

The final set of entries in Table 7.1 depicts relationships between dropping out and three indicators of antisocial behavior: having had disciplinary problems in school, having been suspended or placed on probation, and having been in "serious trouble with the law." There is a remarkably uniform relationship between all three indicators and the dropout rate. Students who acknowledge having been in any one of the three kinds of trouble are about three times more likely to be dropouts, on average, than students who do not report such problems. The differences in dropout rates between the "yes" and "no" responders are relatively uniform among the race/ethnicity-sex categories. Both males and females who have had disciplinary problems, been suspended, or been in trouble with the law leave school at rates on the order of 30 percent, while those who do not report such experiences leave at rates of around 10 percent. The association between antisocial behavior and dropping out is similar for blacks and whites, but dropout rates for Hispanics seem to be somewhat less correlated with such behavior than are the rates for the other groups.

Having experienced disciplinary problems, suspensions, or trouble with the law are, of course, not independent factors one can cite to "explain" dropping out. In most cases, they are undoubtedly concommitant symptoms, along with dropping out, of the student's inability to function acceptably in the school and in the larger social environment. Nevertheless, a history of such behavior can be used, together with such indicators as low test scores and poor grades, to identify those most in need of dropout prevention efforts.

FINDINGS FROM THE MULTIVARIATE ANALYSIS

Although these student behaviors and choices are not independent variables, we have incorporated them into multivariate equations to determine whether they still appear strongly related to dropping out after personal characteristics and other factors are controlled. Specifically, we have fitted equations containing the three sets of behavior and choice variables, personal and family background characteristics, environmental factors, and school variables. The results pertaining to the behavior and choice variables are shown in Table 7.2.

As can be seen, working while in school, marriage and childbearing, and antisocial behavior continue to show strong relationships to the probability of dropping out even when the other factors are held constant. The connection between antisocial behavior and dropping out is especially clear-cut and consistent. Each point on the three-point antisocial behavior scale (one point each is given for disciplinary problems, suspension or probation, and trouble with the law) multiplies the probability of dropping out by, on average, a factor of 5.3. The multiplier falls in the range from 4 to 8 for all race/ethnicity-sex groups and is always highly significant.

Working while in school has a significantly positive relationship to dropping out but generally only if the amount of work exceeds 14 hours per week. The positive relationship shows up clearly for white males and females and Hispanic males but is absent or less clear-cut for the other groups. Black female dropout rates appear not to be affected at all (the estimated effect on the dropout rate is negative but not significant), and black males are adversely affected only if work amounts to more than 22 hours per week. Only the white male dropout rate appears to be positively affected by working less than 15 hours per week.

Strong associations between marriage and childbearing and dropping out continue to be demonstrated when personal and other background factors are taken into account. Looking at all groups combined, the probability of dropping out is 4 times greater for married than for unmarried females (6 times greater if there are also children) and twice as great for married than for unmarried males (4 times greater with children). Having children without being married is associated with a doubling of the female dropout rate but with a statistically insignificant increase in the male rate.

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Table 7.2

ESTIMATED EFFECTS OF CERTAIN STUDENT BEHAVIORS AND CHOICES ON RELATIVE DROPOUT RATES, EVENT HISTORY MODEL, PUBLIC HIGH SCHOOL STUDENTS, BY RACE/ETHNICITY AND SEX

Variable and Basis for Comparison	All	White Male	White Female	Black Male	Black Female	Hispanic Male	Hispanic Female
Hours worked per week							
1-14	.99	1.43*	.89	1.08	1.18	.99	.63*
15-21	1.48*	1.77*	1.82*	1.14	.68	2.67*	1.71*
22 or more	1.54*	2.27*	1.38*	2.51*	.80	2.13*	.79
Marriage/childbearing[a]							
Married, no children		1.35	8.90*	1.27	12.2*	3.15*	10.9*
Female	4.11*						
Male	2.16*						
Children, not married		1.87*	3.97*	1.05	4.66*	.67	6.96*
Female	2.03*						
Male	1.53						
Married and children		4.27*	14.9*	2.67	12.5*	4.70	9.82*
Female	5.98*						
Male	4.42*						
Antisocial behavior (Index)[b]	5.32*	6.42*	7.84*	3.64*	4.54*	4.32*	3.73*

Note: estimates followed by * are significantly different from 1.0 at least at the .10 level of probability.

[a] Separate dummy variables for males and females are included in the equation for all groups combined.

[b] The index of antisocial activity is an equal-weighted index of the dummy variables for having disciplinary problems in school, having been suspended or placed on probation, and having been in trouble with the law.

Both marriage and childbearing have extremely strong associations with dropping out by female students of all race/ethnic groups. Unmarried white females with children are about 4 times more likely to drop out than females without children, and the multipliers are even larger for black and Hispanic females. Married female students, even without children, are 9 to 12 times more likely not to complete school than their unmarried peers. In comparison, male dropout rates are much less affected. Having children, but not being married, is associated with a significant rise in the white male rate; marriage, but not having children, is associated with a significant increase in the Hispanic male rate. The effects on black male rates are statistically insignificant.

Once more, a warning about causal interpretations is in order. Even with personal and other background characteristics held constant, the positive relationships of marriage and childbearing to dropping out do not imply that the former cause the latter. The controls for other factors are not nearly comprehensive enough to rule out common external influences on the whole array of negative life outcomes. An in-depth analysis, examining alternative paths of causality and taking careful account of the timing of school and out-of-school behaviors, is needed to sort out the connections among these variables.

CONCLUSIONS

The relationships found in the descriptive data between dropping out and certain student behaviors and choices--working while in school, marrying and having children, and behaving antisocially in or out of school--are borne out by the multivariate analysis. The association between indicators of antisocial behavior (disciplinary problems, suspension or probation, and trouble with the law) and failing to graduate is large and consistent across groups. A substantial positive association between working while in school and dropping out is confirmed for most groups but only when the amount of work is substantial (more than 15 hours per week). Both childbearing and marriage are associated with extraordinarily high rates of dropping out among females, and marriage has a significant positive relationship to male dropping out as well. Issues of causation have not been resolved, and it cannot be concluded that modifying these behaviors would, in and of itself, alter the dropout rate. Nevertheless, the persistence of strong relationships even when many student background factors and school factors are held constant suggests that such behavioral indicators have large roles to play in identifying potential dropouts and targeting dropout prevention efforts.

Footnote:

1. Approximately 47 percent of working males but only 30 percent of working females report working 15 or more hours per week.

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