ABSTRACT

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ABSTRACT

This study explores the life-cycle relationships between poor mental health and human capital formation for men and women. It tests the hypothesis that parental mental disorder and an adolescent mental disorder during schooling years increase the probability of that individual's dropping out of high school. This study also tests the related hypothesis that current and lifetime mental disorders decrease the probability of his/her labor force participation as well as his/her annual income.

The data for this study are drawn from the National Comorbidity Survey (NCS). I use several types of multivariate analysis to test my hypotheses: Logistic, Ordinary Least Squares, and Tobit regression techniques, as well as Instrumental Variable versions of these techniques (constructed in a two-stage procedure using parental and youth history of mental illness).

The findings from the first part of this study indicate that the probability of dropping out of high school is significantly higher for both girls and boys with parents who suffer from depression, generalized anxiety, and alcohol and drug dependence/abuse compared to those with parents without these disorders. The results from the second part of this study indicate that an early onset (during schooling years) of anxiety, alcohol dependence and conduct disorders significantly increase the probability of dropping out of high school for boys and girls.

The findings pertaining to the impact of current and lifetime mental disorders on labor market outcomes suggest that lifetime mood and anxiety disorders have a negative impact on the probability of labor force participation as well as level of income for women. Lifetime anxiety also has a negative impact on the probability of labor force participation for men. A current anxiety disorder decreases labor force participation rates and income for women. Consistent with the previous studies, there is a mixed impact of alcohol and drug disorders on labor market outcomes for men and women.

NORTHERN ILLINOIS UNIVERSITY

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DEDICATION

To Mom and Dad, with gratitude

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CHAPTER 1

INTRODUCTION

In 1958, Fein argued that mental illness was the nation's No. 1 health problem in terms of cost. In 1994, Kessler et al. reported that about 50% of respondents to a large-scale survey reported at least one lifetime psychiatric disorder and almost 30% had at least one disorder in the 12 months preceding their interviews. While these studies indicate that the economic costs of mental illness have been an important issue for decades, no study to date has considered the loss of years of children's schooling as an indirect cost of the mental illness.

Mental illness is very costly. The direct economic costs of mental illness include the amount spent by the government, by philanthropic organizations, and by individuals on prevention, care, and cure. Table 1 compares the costs of alcohol and drug abuse for 1985, 1992, and 1995 estimated by the Lewin groups (Harwood, Fountain & Livermore, 1992).

A broader definition of the costs of mental illness should also include indirect costs, which include the impact on work productivity (lost days of labor force for the people under treatment, and the lower productivity of people who stay at work), crimes, and criminal justice. Thus, in addition to the cost of alcohol and drug

dependence/abuse, which is included in Table 1, we should include the loss of years of schooling due to both parental and individual mental illnesses.

TABLE 1
COSTS OF ALCOHOL AND DRUG ABUSE ADJUSTED FOR CHANGES IN INFLATION AND POPULATION FOR 1995

	1985	1992	1995	1985	1992	1995
Specialty Alcohol And Drug Services	$10,172	$5,573	$6,660	$3,735	$4,400	$5,258
Medical Consequences	$4,935	$13,247	$15,830	$226	$5,531	$6,623
Lost Earnings Premature Death	$34,573	$31,327	$34,921	$4,740	$14,575	$16,247
Lost Earnings Illness	$39,482	$69,209	$77,150	$8,694	$15,682	$17,481
Lost Earnings Crime/Victims	$4,564	$6,461	$7,231	$27,753	$39,164	$43,829
Crashes, Fires, Criminal Justice, etc	$10,307	$22,204	$22,204	$18,537	$18,307	$20,407
Total Millions of 1995 dollars.	$104,033	$148,021	$166,543	$63,685	$97,659	$109,832

Sources: Harwood, Fountain, & Gina (1992) which is estimated by the Lewin Group.

Note: Components may not sum to totals because of rounding.

This study seeks to extend the previous literature by examining factors related to the indirect costs of mental illness. I estimate (1) the impact of parental mental disorders on the probability of high school dropout; (2) the impact of respondents' own mental disorders during schooling years on the probability of high school dropout; and (3) the impact of four types of lifetime and current mental disorders on adult labor force participation rates and income. These are the costs of mental illness

to society which are often overlooked in cost-of-illness studies because they are less direct than the cost of medicine and therapies. Yet, my empirical results demonstrate that these indirect costs are often quite large.

Several empirical studies in labor economics have found that mental illness has a significant impact on adult labor force participation rates and income levels.[1] In these studies the level of schooling is assumed to be given so the effects of mental illness are limited to the direct effects in the labor market. Mental illness may, however, also have a significant indirect effect on adult labor market performance by reducing the level of schooling before entry into the labor market. Numerous empirical studies in the field of human capital research indicate that years of schooling have an important effect on occupational status and earnings.[2] Consequently, if mental illness reduces schooling attainment, then it will have a significant indirect impact on adult labor market performance. This is consistent with the argument of Stern, Paik, Catteral, and Nakata (1989) that the high school graduate's success in the labor market may be due to unobservable characteristics of the individual. These characteristics make the individual more productive on average than a high school dropout in both schooling attainment and labor market performance. In this dissertation I examine the effect of parental mental illness and the individual's mental illness--factors that are omitted (unobserved) in most studies on schooling attainment and adult labor market performance.

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[1]E.g. Marcotte, Wilcox-Gök & Redmon (2000); Slade & Albers (2000); Ettner (2000); Ettner, Frank & Kessler (1997); Bartel & Taubman (1986).

[2]E.g., Becker (1993); Nerdrum (1999); Card (1999); Blackmore & Low (1984); Stern, Paik, Catterall, & Nakata, (1989); Bedi & Gaston (1999).

Specifically, in this study I examine the life-cycle impact of four major types of mental disorders (mood, anxiety, alcohol, and drug disorders) on the probability of high school dropout rate and labor market outcomes. These subgroups of disorders are the major groupings used in DSMIII-R. I am examining these disorders for two reasons. First, these mental disorders are the most prevalent among the American population. Kessler et al. (1994) report that about 25% of Americans suffer from lifetime anxiety disorders and a similar number suffer from lifetime substance abuse disorders, while about 20% suffer from mood disorders during their lifetimes; moreover, there is a high incidence of comorbidity among these psychiatric disorders. For example, about 52% of persons with lifetime alcohol dependence or abuse and 59% of lifetime drug dependence or abuse also have psychiatric disorders.[3] The second reason for my focus on these disorders is that they are highly treatable with drug and behavioral therapy at relatively low cost. Many studies suggest that the estimated costs of treatment for these types of disorders are substantially lower than the productivity losses due to these mental disorders (e.g., Lave, Frank, Schulberg, & Kamlet, 1996).

The first objective of this study is to test whether children whose parents are mentally ill have a higher probability of becoming high schools dropouts than children of parents without mental disorders. Research on schooling attainment in the economic literature has established that family characteristics, such as parents' schooling attainment and family income levels, contribute significantly to the

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[3]Because of the high incidence of comorbidities, it is essential that my investigation of the effects of psychiatric disorders include co-morbid disorders.

successful completion of high school.[4] In the child psychology literature, many studies [5] indicate that children with mentally ill parents have a higher probability of experiencing social isolation, economic stresses, low self-esteem, poor health status, and lack of adequate social support. These negative factors may cause the children to experience problems with schooling attainment and labor market performance later in their lives.

No economic study to date has, however, examined the impact of major parental psychiatric disorders on the probability of their children dropping out of high school. Parental mental illness is an important aspect of family background that typically is omitted (unobserved) in human capital studies of schooling attainment and adult labor market performance.

The second objective for this study is to investigate the impact of five major mental disorders (mood, anxiety, alcohol, drug, and conduct disorders) during the primary and secondary schooling years on the probability of an individual's dropping out of high school, *ceteris paribus*. Several empirical studies have established the linkage between the individual's health and human capital formation.[6] Many psychological studies report that adolescent depression may produce functional academic impairment (Judd, Martin,Wells, & Rapaport (1996). In addition, it has been

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[4]E.g., Behrman, Pollak & Taubman (1995); Mayer (1997); Durlauf (1996); Haveman & Wolfe (1994), Astone & Mclanahan (1994); Manski, Sandefur, Mclanahan & Powers (1992); Barrington & Hendricks (1989); Rumberger (1983).

[5]E.g., Shaffer, Lucas & Richters (1999); Mayer (1997).

[6]E.g., Grossman (1972a, 1972b); Hamilton, Merrigan & Dufresne (1997); Hunt-McCool & Bishop (1998).

found that adolescent depression is highly associated with other disorders such as anxiety, conduct disorder, eating disorders, and substance abuse (Rice & Leffort, 1997). In spite of the evidence from psychological studies that report the negative impact of psychiatric disorders on schooling, few economic studies have incorporated psychiatric disorders into models of human capital formation,[7] and those studies have mainly focused on the effects of alcohol and substance abuse.

The final objective of this study is to examine the effect of mental illness on adult labor market outcomes. Many empirical studies in the labor economics literature report that poor health status has a negative impact on labor market outcomes, independent of the level of schooling. Other studies report, however, a negative impact of socio-economic status on individuals' mental health.[8] To control for this simultaneity between labor market outcomes and mental health, I use instrumental variable (IV) techniques to identify the impact of psychiatric disorders on labor market outcomes. Recent studies have used a similar IV technique.

This study extends the findings of previous research by considering the effects on adult labor market outcomes of four major types of mental disorders: mood, anxiety, alcohol, and drug dependence/abuse. Using instrumental regression and comparing the results from ordinary least square regression (OLS) estimation, the results are checked for the presence of endogeneity between mental health and high school dropout.

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[7]Bray, Zarkin, Ringwalt & Qi (2000); Cook & Moore (1993).

[8]Kessler (1982); Grossman 1972a.

In my empirical research, I use observations of 1757 women and 1632 men of working age who are respondents to the National Comorbidity Survey. When weighted, the NCS is a nationally representative sample of the United States population.

The great implications of my findings with the NCS data indicate that psychiatric disorders have an important influence on schooling attainment, earnings, and labor force participation. The large long-term impact of psychiatric disorders suggests that policies designed to mitigate the effects of mental illness on schooling attainment may well be efficient uses of society's resources.

The details of the study are presented in the next five chapters. Chapter 2 contains a review of the literature relevant to this study. The theoretical model and hypotheses are described in Chapter 3. A description of the data and the estimating models are presented in Chapter 4. Empirical results are presented in Chapter 5. Finally, Chapter 6 contains a discussion of the findings and the implications of this research, as well as comments on the direction of my future research on this subject.

CHAPTER 2

LITERATURE REVIEW

My research examines several effects of mental illness. First, I review literature relevant to my study of the impact of parental mental illness on children's schooling. I consider literature describing the effects of parental mental illness on family environment and children's functioning (2.1) as well as the literature describing the impacts of family environment on children's schooling attainment (2.2).

Second, I review the literature relevant to my study of mental illness during schooling years on schooling attainment. I describe the literature pertaining to the effects of the individual's own poor health on schooling attainment (2.3). While many empirical studies have established a positive correlation between health and human capital formation, these studies largely limit their analysis to the effects of poor physical health and alcohol or drug dependence/abuse.

Third, I review the literatures relevant to my study of the effects of mental illness on adult labor market outcomes. In particular, I consider the literature that provides evidence of the impact of schooling and health on adult labor market outcomes (2.4 and 2.5). Finally, I summarize the notable findings of this literature and relate them to my research.

2.1 Parental Mental Illness and Family Environment

The first study that I review describes the impact of mental illness on children. By employing a multi-method, multi-informant study design and using a sample of 205 white seventh-grade boys aged 12 to 14 years who come primarily from intact middle-class families in the rural Midwest, Conger et al. (1992) investigate the link between economic stress in family life and problems in making adjustments by adolescents. They find that objective economic pressures such as unstable work and per capita income increase emotional distress, and cause depression that leads to both marital conflict and lack of skillful parenting. These, in turn, directly affect early adolescent adjustment.

In another study applying logistic regression to the National Comorbidity Survey, Kendler, Davis, & Kessler (1997) investigate familial transmission of five common psychiatric disorders: major depression, generalized anxiety disorder, antisocial personality disorder, alcohol abuse/dependence and drug abuse/dependence. They also examine the degree to which these parental disorders can predict children's disorders by controlling for environmental adversities as covariates. Investigating the data suggests that for the NCS sample fathers are more likely than mothers to have antisocial personality disorder, alcohol abuse/dependence and drug abuse/dependence. Mothers are more likely than fathers to have major depression and generalized anxiety disorder. The results suggest that the familial/genetic risk factors for mood disorder and generalized anxiety disorders may be highly correlated. For example, higher percentages of parents with mood disorders (34.4%) have children with the same disorder compared to the percentage of parents who did not have this disorder but

whose children had this disorder (16.1%). The odds ratio for familial transmission for alcohol abuse/dependence and generalized anxiety disorders are 2 and 3.2, respectively. The results of this study are consistent with the findings of previous clinical studies that depression is the most common mental illness, especially for women of childbearing ages. The odds ratio between major depression in the mother and that of her children is significantly larger than the odds ratio between the father and his children. The authors argue that, while some studies suggest that parents' psychiatric disorders may be more severe on their like-sexed children's as a role model, the results of their study do not show significant gender differences in familial transmission of psychiatric disorders. Thus, the familial transmission of psychiatric and substance abuse disorders act similarly on men and women.

Finally, in a study illustrating the disruptive effects of mental illness on family life, Roberts (1998) uses data from the National Medical Expenditure Survey to estimate the labor market effects of mental illness on the family members of a mentally ill person. Using probit, Tobit and multiple regression models, she finds a significant positive effect on the probability of labor force participation rates for male family members of the mentally ill, although there was no significant impact on the labor force participation rates of female family members. She finds that the hours of work for both men and women are reduced by mental illness in the family.

2.2 Family Environment and Schooling

> "Economists have traditionally believed that the link between parental resources and children's outcomes operates through human capital investment." (Shea 1997)

The principal framework of investment in the human capital model is based on the model of Gary Becker and his colleagues (Becker 1981; Becker and Tomes 1986).[9] Becker in his Woytinsky Lecture explores the relationship between biological, economic and cultural endowments that parents pass on to their children and the education and labor market outcomes that these children subsequently enhance. He indicates that family background is a major determinant of opportunities for individuals. To quote Becker (1993, p. 260), "Some children have an advantage because they are born into families with greater emphasis on childhood learning, and other favorable cultural and genetic attributes. Both biology and culture are transmitted from parents to children, one encoded in DNA and the other in a family's culture."

Studies of monozygotic (identical) twins have shed light on the genetic and environmental source of family background effects on schooling and labor market outcomes. An example is the study by Behrman, Taubman, & Wales (1980). By using data from the NAS-NRC twin sample of 2478 pairs of white twin brothers who were born between 1917-1927 and interviewed in 1974, and by employing recursive structural equations in the human capital models, Behrman et al. (1980) estimate four major socioeconomic indicators: schooling, initial occupational status, mature

[9]Reprinted in Becker 1993.

occupational status, and the logarithm of mature earnings. The authors found that, although the results of estimation depend upon the type of estimation used, the results of the best estimation indicate that genetics account for more than half of the total family effects (including both genetic and family environmental effects) in determining the socioeconomic success.

Other studies have sought to identify particular factors of family background that influence schooling attainment. Rumberger (1983) investigated the effects of family background and other factors on the decision to drop out of high school. The sample data were 12,700 young men and women between the ages of 14 and 21 from the National Longitudinal Survey (NLS) of Youth Labor Market Experience with an over-representation of blacks, Hispanics, and poor whites. By employing the probit model and constructing two sets of independent variables from the data, he argues that modeling the determinants of dropout behavior is difficult because of two reasons. First, it is difficult to determine strict causality from intervening factors. Second, it is hard to determine the magnitude of the various factors affecting high school dropout rates. For example, it is not clear whether or not some behavioral attitudes such as marriage and childbirth are the symptoms or causes of dropping out of high school. The first model included only exogenous variables influencing dropout behavior such as family background and some geographical variables. The family background measures included family structure, parents' education and earnings, number of siblings, a cultural index indicating the presence of reading material such as newspapers, magazines, and home libraries when the respondent was 14 years old, geographic location and local unemployment rates at the time of interview. The

second model contained a set of intervening psychological factors that might be influenced by family background and that also might affect dropout behavior. These included a proxy measure of ability, the respondent's educational aspirations, aspirations for a professional or managerial occupation at the age of 35, as well as other variables that have commonly been led to dropout such as getting married and becoming pregnant while in school. The results indicate that the most important reason women leave school is pregnancy or marriage, whereas for men it is work. Rumberger also found that family background ability and aspirations strongly predict dropout behavior, especially for young people from lower socio-economic status families.

In another study using data from the cross-sectional, supplemental Black and supplemental Hispanic panels of the National Longitudinal Study of Youth (NLSY), Manski, Sandefur, Mclanahan, and Powers (1992) investigate the association between family structure and high school completion rates of men and women between the ages of 14-21. They use parametric and non-parametric models by including or excluding prior information about family structure and children's educational and economic outcomes. They find that children from intact families with educated parents have a higher probability of graduating from high school.

Haveman and Wolfe (1994) examine the determinants of high school completion rates by using data from the Panel Study of Income Dynamics (PSID). The PSID has annual information describing the children's characteristics such as race, gender, age, and grade in school, as well as family characteristics such as income and education of the parents. To these the authors add the unemployment rate, welfare

benefits and the estimation of the potential earnings for the region in which the children live. Using probit and Tobit regressions for high school completion, they report that several parental characteristics, including the presence of a disabled parent, are significant in determining a child's schooling success. They also argue that since some unobservable factors such as genetic endowment are likely to be associated with the parents' education and income levels, excluding these factors is more likely to cause omitted variable bias in the analysis of the determinants of children's level of schooling.

Astone and Mclanahan (1994) investigate the relationship between family structure, residential mobility, and high school dropout rates. The data was from 10,434 students at one of a nationally representative sample of 1,000 U.S. high schools, which was first conducted in 1980 by the National Research Corporation. The sub-sample of respondents was re-interviewed in 1982, 1984, and 1986. The independent variables used were: family structure, residential mobility, family socioeconomic status, race, region of residence, number of siblings, and sex of respondent. First, by using the multinomial logit model, the authors find that children who live with only one of their parents during their high school years have a higher probability of moving or changing school several times compared to children who live with both original parents, *ceteris paribus*. Second, by using a single-equation logistic regression model, they found that residential mobility accounts for 18% of the educational disadvantages associated with living in a single parent family and for 29% of the disadvantages associated with living in a step family.

By comparing World War II veterans who were eligible for the educational benefits of the GI bill with the succeeding generation who had less access to financial resources for college education, Behrman, Pollak, and Taubman (1995) investigate the issues of intra-family schooling differences. They find a statistically significant inverse relationship between family size and children's schooling and earnings, *ceteris paribus*. This implies that unequal access to financing leads to less schooling for children from larger families compared to children from smaller families.

Lillard and Kilnurn (1997) investigate the relationship between the earnings of related individuals. A sample of 5,500 households from the Panel Study of Income Dynamics (PSID) and alternative structural specifications, the PSID is a large national longitudinal data set that has detailed information on socioeconomic and demographic variables including earnings. The first survey was conducted in 1968 and has been repeated annually since 1968. This study uses the panel through the 1992 survey. Using alternative specifications, they find that the results are sensitive to the selection of different specification models. By controlling for the father's transitory variation in earnings, the authors obtain about 50% higher explanatory power for the father's permanent earnings in explaining the permanent earnings of his sons and daughters than that found in the previous literature. Due to the high correlation between mothers' and fathers' earnings, the addition of a mother-specific component does not improve the explanatory power of the estimation. This indicates that the fathers' earnings could include the contributions from fathers and mothers to their children's permanent earnings. The authors also find a similar contribution of parents' permanent earnings to the permanent earnings of their sons and daughters. Finally,

they find that individuals marry people with similar family background and the common components among individuals related by marriage are as strong as common components that children share with their siblings. Thus, they conclude that it is important to include spouses' earnings for estimating the links between parents' earnings and their children's permanent earnings.

By using a nationally representative sample of the Panel Study of Income Dynamics (PSID) and employing both an OLS and a 2SLS model, Shea (1997) investigates the impact of parental income on children's human capital accumulation. He argues that since income is most probably correlated with unobserved abilities transmitted across generations, it is difficult to conclude that parental income is the determinant of the levels of their children's human capital. By using other parental unobserved factors such as union, industry and job loss experience as instrumental variables, he distinguishes a correlation from causality of the effects of parental income and finds that parental income has a negligible effect on children's wages, earnings, and years of schooling. He finds, however, that parental income has a more significant impact on children's human capital for lower income families due to liquidity constraints.

By using a series of parallel ordinary least squares (OLS) multiple linear regressions Smith, Brooks-Gunn, and Klebanov (1997) examine the effects of income, family structure, human capital, and the home environment on young children's cognitive outcomes based on three types of assessment: IQ, verbal ability, and achievement tests. The data were from 966 children of the NLSY between three and four years of age. The data contain the detailed longitudinal demographic information

about the relevant families. The original NLSY study over-sampled poor and minority youths. The results indicate that the mothers' education, family income, and home environment have highly statistically significant effects on children's cognitive outcomes.

2.3 Health and Socioeconomic Success

Grossman (1975) defines the correlation between health and schooling in three ways: first, a larger number of schooling years improves health conditions. Second, better health leads to higher level of schooling and third, an individual's physical and mental ability and parental characteristics such as education affect both health and schooling in the same manner (p. 148). By using data from the NBER –Thorndike sample, he constructs a model of demand for health that allows health to be partially endogenous and under the control of individuals. He uses recursive and simultaneous models of household production function to formulate and estimate the health-schooling relationship.[10] The results of his study indicate that the causal relationship runs from schooling to health and from health to schooling and also from third factors to both health and schooling. He also finds that health is an important determinant of market productivity and hourly wage rate.

Taubman and Rosen (1982) explore the interrelationships between health status with several sociodemographic and economic variables for white men over time. The data is a random sample of 11,000 men and women between the ages of 58

[10]The stock of health quantified in the sample was determined by asking the question whether the general health was excellent, good, fair, or poor.

and 63 from the Retirement History Survey (RHS) conducted in 1969. The respondents were asked for current and past labor force activity, current earnings and income, family structure, education, health-related and other expenditures, and health status. Respondents to the first interview or their widows were re-interviewed every second year until 1979. This study uses the responses from 1969, 1971, and 1973. The health-related estimates were based on questions asked of respondents to compare their health with that of others of the same age group and with themselves at the time of the prior survey. The analysis is a linear model based on contingency tables of three or four categories for qualitative dependent variables. They find a high correlation between the state of a person's health over time and education and marital status, over and above controlling for family income, use of medical resources, and previous health status.

By applying multiple regression analysis to 21 variables and a drug severity index, Friedman, Glickman, and Utada (1985) investigate the determining factors of high school dropout rates. They find that high school dropouts compared to those who graduate are more likely to be male, from non-intact families, larger families, and have less educated mothers and more severe drug dependency. The study uses a sample of 526 students from the 9^{th}, 10^{th}, and 11^{th} grades of two Philadelphia public high schools who volunteered for this study during the academic year 1980-1981. Using the multiple regression equation they find that 135 of the 265 students who had been using drugs had dropped out of high school compared to only 42 of 158 (one out of four) of the non-drug-using students. They conclude that the limitation of the data does not

allow them to determine whether drug use was a cause of dropout or whether dropout was the consequence of a more basic unobserved cause.

Mullahy and Sindelar (1989) examine the set of reduced form estimates of education, occupation, earnings, and current disorder outcomes by controlling for age, race, father's education and occupation and early symptoms of alcoholism and other mental disorders, for males aged 25-59. They used data from the New Haven site of the Epidemiologic Catchment Area (ECA) surveys. First, they found that alcoholism at an early age significantly reduces educational achievement. Consequently, lower educational attainment leads to lower earnings and occupational status. They indicated that because the standard methods of estimating the impact of alcoholism does not fully account for the important direct and indirect simultaneous effects of alcoholism on labor market outcomes, the full effects of alcoholism on labor market performance are underestimated. They argue that the potential indirect effects of alcoholism on labor market outcomes (through education, marital status, and other key aspects of the human capital formation process) should be investigated. Second, they argue that in the labor market, these will be a tradeoff between higher wages and unobserved occupational characteristics such as desirable working conditions. Conversely, individuals with mental illnesses may accept lower wages to obtain generous health insurance or other desirable job conditions that best accommodate their disorders compared to those of healthy individuals. This self-selection into occupations of affected individuals may cause the impacts of mental disorder on earnings to be overestimated.

By employing National Longitudinal Survey of Youth data (NLSY79), Cook and Moore (1993) investigate the effect of youthful drinking on years of schooling and successful completion of college. They used the state beer tax and minimum purchase age for alcohol as instrumental variables in estimating youth drinking. The results indicate that since higher state beer taxes and higher minimum ages reduce teenagers' consumption of alcohol, students who attend high school in states with relatively high alcohol taxes and high minimum legal drinking ages have a higher probability of graduating from college. They also report that having a father with an alcohol problem lowers the probability of completing college. Finally, they conclude that policy makers should note the consequences of the state beer tax and minimum age for educational attainment when conducting alcohol control policy debates.

Anderson, Mitchell, and Buttler (1993) use data from Epidemiological Catchment Area Surveys to examine the effects of adolescent disorders on schooling and adult labor market outcomes. The results of their study indicate that, although adolescent disorders have negligible effects on the probability of developing any other mental health disorder such as psychoses, they have a significant negative effect on schooling and a significant positive effect on having antisocial personality disorders or substance abuse problems in adulthood. Schooling and mental health statuses are, however, strong predictors of occupational choice. Individuals with antisocial personality behaviors as adolescents have a lower probability of being employed and, if they do have a job, it is less likely that they will be employed in highly paid positions.

Ross and Mirowsky (1999) investigate the association between health and education through three aspects of a person's education: quantity, credentials, and selectivity. They define the quantity of education by years of formal education, credentials, by whether or not person has a college degree, and selectivity by the quality of the attended college or university. Health status is based on measuring the efficiency of physical functioning in daily activities. The respondents were asked to report their physical functioning for daily life in the range between 0-2, great difficulty (coded 0), some difficulty (coded 1) and no difficulty (coded 2). The data are from the 1995 Aging, Status, and the Sense of Control Survey, a representative U.S. national telephone survey of 2,593 respondents aged 18 to 95, with an over-representation of the elderly. The results indicate that each additional year of education is significantly associated with an improvement in health even after adjustment for family background. High levels of education increase the likelihood of having full-time employment, better jobs, higher incomes, and social support. All these factors improve health by decreasing depression, anxiety, and psychological distress. Also, school culture (college selectivity) has a helpful effect on health, lifestyle, habits such as drinking, smoking, and participation in athletic activities, and other behaviors that affect health, even after controlling for factors such as age, sex, race, marital status, and parental education. The possession of a college degree does not show health benefits compared to those who have not completed college.

Using data from a longitudinal survey of 1392 students in a southeastern U.S public school system, Bray, Zarkin, Ringwalt, and Qi (2000) investigate the relationship between the initiation of marijuana use and the probability of dropping

out of high school. They find that marijuana users are 2.3 times more likely to drop out of high school than non-users. They conclude that although the result of this study is very important, it is necessary for policy makers and researchers to investigate the results with a nationally representative sample.

Few studies in sociology have examined the relationship between psychiatric disorders and individuals' socio-economic status. Kessler (1982) uses data from eight epidemiological surveys to estimate the relationship between income, education, and occupational status with distress, measured by psychiatric symptoms screening scales. The two major types of psychiatric symptoms were those that measure depressed mood and anxiety. He found that while each indicator of position, income, education, and occupational status independently influences emotional functioning, there is a multidimensional relationship between each aspect of socio-economic status and the net stress impact on the others. He also finds that the magnitude of the education-distress relationship varies among men and women. Among men, income is the strongest predictor of distress followed by education and occupational status and for women education is the most significant indicator. Finally, he mentions that for evaluating this variation, an analysis of coping strategies is required.

In a later article, Kessler, Foster, Saunders, and Stang (1995) uses 10-year birth cohorts drawn from the National Comorbidity Survey in 10-year birth cohorts to investigate the impact of the early onset of anxiety disorders, mood disorders, substance use disorders, and conduct disorders on four educational transitions: primary school, high school, failure to enter to college for high school graduates, and failure to complete college for college entrants. They find that the proportion of high school

dropouts with psychiatric disorders has increased dramatically in recent years to 14.2% and college dropouts to 4.7%. Among four major psychiatric disorders, conduct disorders for men and anxiety disorder for women have the most negative impact on their schooling attainment. Note that this study did not, however, include parental mental illnesses as control variables.

Jayakody, Danziger, and Kessler (1998) use a sample of men between the ages of 25-54 from the National Comorbidity Survey to investigate the impact of the early onset of affective disorder, anxiety disorder, substance use abuse disorder and conduct disorders on schooling attainment, marital status, employment, and current mental illness. They argue that because women's socio-economic status is dependent on their family roles, it is difficult to estimate the impact of psychiatric disorders on women's employment status. For the sample of males, the authors find that the early onset of psychiatric disorders (before age of 16) reduces educational attainment and the probability of getting married and increases the probability of having recent psychiatric disorders. This, in turn, leads to a higher probability of being unemployed. Among different categories of mental illnesses, males with an early onset of conduct disorders are three times more likely to drop out of high school than others. The authors also report that having a parent with a history of a psychiatric disorder does not significantly affect educational attainment, but decreases the probability of being married and increases the probability of having a recent disorder. Because the focus of their study is to investigate the impact of the individual's own mental illness on his/her socio-economic status, the authors do not detail the type and severity of parental mental illnesses used in their study.

Mayer (1997) states that since there is a high correlation between parental income and non-economic parental characteristics such as attitudes, values, and personal behaviors, controlling for these parental characteristics provides a more accurate estimation of the effects of parental incomes on children's outcomes. She also argues because low-income people are more likely to suffer from mental health problems than high-income individuals, the empirical evidence in psychological studies pertaining to the parental-stress hypothesis is likely to be biased.

2.4 Education and Labor Market Outcomes

There is abundant empirical evidence in the labor economics literature that individuals with more education earn higher wages.[11] Numerous studies report estimates of positive rates of return to schooling. Although the rate of return to education may vary for individuals with different parental background, school quality, and the level of education, Ehrenberg and Smith (2000, p. 314) cite estimates of the rate of return to education for the average American worker between 5% to 12%.

Many studies have examined the impact of high school completion on labor market outcomes. Why focus on high school completion rather than years of schooling? Screening theory suggests that potential employers may find that requiring a high school diploma is a low-cost screening device. Low productivity workers will not have a high school diploma and will be eliminated from the applicant pool. Many empirical studies provide evidence that education is used as a screening device (called

[11] Recent examples include: Stern, Paik, Catterall,& Nakata (1989); Tyler, Murnance, &Willett, (2000); Marcotte (2000); Ginther (2000); Dutta, Sefton, Weale, & Martin (1999); Ashenfelter, Harmon, & Oosterbeek (1999).

"sheepskin" effect). For example, Kaufman (1994, p. 338) cites studies that estimate the marginal rate of return to the 12th and 16th years of schooling to be much higher than the 11th and 15th years. This implies that acquiring the diploma has a larger impact on earnings than is due to the additional knowledge gained during that extra year of schooling.

A high school diploma also has additional long-term benefits. Using the National Longitudinal Study of the High School Class of 1972 (NLSHS), consisting of 22,652 high school seniors, and using modeling wage determination in a recursive structure with a dichotomous high school completion variable, Blackmore and Low (1984) investigate the long-term impact of high school dropout on the individual's market wage. They find that the gap between the earnings of dropouts and graduates increases with age. The authors conclude that their results support the idea that graduation from high school serves as a signal for employers.

Finally, Card (1999), in a literature review on the causal relationship between education and earnings, finds that a simple OLS regression model with a linear schooling term can explain 20-35% of the variation in observed earnings data. The estimated returns obtained by using the instrumental variables are, however, 20-40% above the corresponding OLS estimates. One possible explanation for this is that marginal returns to schooling for specific groups such as disadvantaged groups may be higher than the average marginal returns for education in the total population.

2.5 Mental Illness and Labor Market Outcomes

Studies on the impact of mental illness in the human capital literature have primarily focused on the labor market costs of mental illness for the ill person. In a relatively recent study, Mullahy and Sindelar (1991), using data from the New Haven Site of the Epidemiological Catchment Area of individuals 18 years and older and employing life cycle profiles, investigate why earlier studies had obtained conflicting results regarding the effects of alcoholism on earnings, income, and wages. They suggest that the relationship between alcoholism and labor market outcomes depend strongly on the age. At young ages alcoholism leads to a higher probability of dropping out of high school, which subsequently increases labor force participation rates and thus earnings for young adult drinkers. Later on in the life cycle, however, the higher schooling attainment of non-alcoholics conversely causes the earnings of non-alcoholics to overtake the earnings of alcoholics. Over the entire life cycle, alcoholics may have lower savings and consequently choose larger labor force participation and have higher earnings compared to their non-alcoholic counterparts who have accumulated enough savings to retire. They argue however, that the magnitude and significance of the effects of alcoholism on labor market outcomes depend on the different measures of incomes and different populations. They find a relatively larger impact of alcoholism on labor supply shifts than on change in wages and incomes.

By using the data from the National Academy of Science-National Research Council twin sample and employing multinomial logit and Tobit regression, Bartel and Taubman (1986) investigate the economic and demographic consequences of

mental illness. Using the data from both 1967 and 1973 surveys allow them to cross-check the results. They find that mental illnesses in men reduce incomes, increase the probability of being single, lower the number of offspring, and increase the labor force participation rates of wives.

By employing maximum likelihood, simultaneous equation generalized probit model and by using the data from Montreal residence Hamilton, Merrigan, and Dufresne (1997) estimate the relationship between employment and mental health, while controlling for endogeneity. Individuals are asked about having about 29 different symptoms that could be classified into four major groups: depression, anxiety, anger, and cognitive disturbance. The other explanatory variables for estimating mental health and employment are age, sex, education, marital status and also one variable indicating the presence of mental disorders during the last three months of the survey. They find a statistically positive and significant relationship between mental health status and employment. Good health status increases the probability of employment and also employability improves health. The endogeneity between employment and mental health implies that ordinary least square (OLS) estimation is upwardly biased and maximum likelihood (ML) estimation is more efficient. They also re-estimate the model with alternative specifications with and without including prior mental health status, number of children and interaction between gender and number of children. In all cases mental health and employment, however, had significant, robust effects on one another.

Using the National Comorbidity Survey, Ettner, Frank, and Kessler (1997) investigate the impact of any psychiatric disorders (both mental and substance uses

disorders) on employment rates, work hours and personal income. Since mental health may be affected by employment status, they examine the endogeneity bias using parental history of mental disorders to predict the direct effect of current mental disorder on labor market outcomes in an instrumental variables estimation. They argue that this method can capture the genetic and environmental effect (at childhood) of living with mentally ill parents and differentiate that from the impact of psychiatric disorders influenced by work status. Because the high collinearity precludes the identification of impact of each separate disorder (due to small cell sizes) by using IV estimation, they examine the impact of having any psychiatric disorder on labor market outcomes. Their findings suggest that psychiatric disorders significantly reduce men's and women's employment, decrease men's hours of work, and reduce the income of both men and women. Comparing the results of IV and OLS estimation, they find that the effect of having a psychiatric disorder after instrumenting (with one exception for male income) becomes larger. Finally, after re-estimating the models without controlling for repondents' marital status, number of children, education, and spouses' education, they find that the results are sensitive to the estimation methods and specification of the model.

Using data from the National Comorbidity Survey and employing the instrumental variable method, Marcotte, Wilcox-Gök, and Redmon (2000) find that depression has substantial negative employment and income effects for women and that dysthymia has a negative income effect for men. In order to obtain an unbiased estimate of the direct effects of affective disorders on earnings, they use information about the parental history of affective disorders as exogenous factors that directly

predict respondents' current mental illnesses. They argue that since parental history of mental illness is unlikely to have an independent effect on individuals' current earnings, it can be used to predict the onset and presence of a respondent's mental disorders. They use the predicted probability of affective disorders as an instrument (adjusting for all other factors which traditionally have been used in predicting labor market outcomes) to identify the marginal effect of affective disorders on earnings.

By using data from the 1993/1996 Baltimore Epidemiological Catchment Area (ECA) Follow-up survey, Slade and Albers (2000) examine whether the symptoms of mental disorder directly affect the labor force participation rates. To solve the endogeneity problem between mental health and employment, the ECA follow-up includes a longitudinal record of spells of symptoms that occurred between 1981 and the follow-up interview. They compare three different specifications by the base case specification, which previously has been used in the literature on labor supply. They find substantial impact of symptoms on the probability of a labor force exit.

By using a nationally representative sample of non-elderly adults from the 1995 Midlife in the United States (MIDUS), Ettner (2000) investigates the impact of both physical and mental health on labor market outcomes. To examine the endogeneity bias problem between health and employment, she first generates two alternative subsets of instrumental variables, previous health status and parental health status. Then, she re-estimates the equations for job characteristics as a function of health status.

In addition to physical and mental health as the main explanatory factors, she includes factors in the model that traditionally have been used in predicting labor

market outcomes. These include respondent characteristics such as age, urbanity, race, marital status, education, whether the respondent was born in the United States, the net assets of the respondent and his/her spouse, whether or not respondent grew up in an intact family, the educational attainment of the respondent's parents, state unemployment rate at the time of survey (1995), and spousal education and health.

Ettner's results indicate that among female workers, those with more disabilities are more likely to be self-employed and those with better self-assessed health have higher-ranking jobs that require more skills. In contrast, for male workers, those suffering from depression, anxiety, or panic disorders are less likely to be self-employed and are more likely to hold jobs that require less skill.

Ettner also finds that the largest predictor for labor force participation rates for women is the necessity of financially supporting the family, a need that is related to their husbands' mental health and education. For men, however, neither education levels nor the health status of wives show a statistically significant impact on husbands' employment.

Ettner finds that the largest effect of health status is on the probability of employment relative to job characteristics. Her results, however, do not show a consistent pattern explaining the impacts of different measures of health status on the different job characteristics. She argues that if workers self-select those jobs that minimize adverse effects, then the impact of poor health on employment will be underestimated. Finally, because the instrumental variable estimates are consistent with the original estimates, she concludes that although health status is probably

endogenous to employment, using a suitable instrument may not improve the estimation significantly.

2.6 Summary

Many studies in economics have investigated the impact of socioeconomic background on children's schooling attainment. In general, the results of previous studies of factors affecting schooling attainment show the positive effects of parental socio-economic status, parental education, amount of time spent with children, and the negative effects of the number of siblings, getting married and teen parenting during the schooling years. Previous studies are limited in several ways. First, some estimates may be substantially biased because of the omission of important variables such as parental health status. Thus, although the socioeconomic background has a significant impact on children's schooling attainment, some aspects of family background that are usually unobserved may have an even greater impact on years of schooling completed.

A second limitation of many studies in the literature is that the data used in studies of sociologists and developmental psychologists often only include institutionalized populations. Therefore, the estimates obtained are likely to suffer from selection bias because the analysis is restricted to persons who already have mental illnesses. Broader, internationally representative samples are needed to compare the effects of mental illnesses on schooling and labor market outcomes.

By using large nationally representative samples, economists have examined the effects of parental income on their children's schooling, adolescent labor force

participation rates and wages. In economics studies using large data sets, however, the main drawback is that health status measures are often unavailable. This lack of health measures has typically prevented economists from investigating the effects of parental mental illness. In contrast, developmental psychologists use small samples to examine the correlation between parental behavior and children's outcomes. In psychological studies, the main drawback is small sample size. Small sample size implies that there are too few cases to estimate all the potential effects of family background on children's outcomes.

This study overcomes these limitations. First, this study uses a large nationally representative sample, which includes the data from both institutionalized and non-institutionalized populations. Second, the data used in this study provide better information about family background (as well as the typical measures of sociodemographic factors and labor force participation).

CHAPTER 3

THEORETICAL BACKGROUND

In this chapter, I present two models. In the first model I derive an expression for optimal schooling as a function of parental mental illness and the individual's own school-age mental illness. From this expression, I derive my first two hypotheses:

Hypothesis # 1. Children whose parents have a psychiatric disorder will have lower schooling attainment than children with parents without disorders, *ceteris paribus*.

Hypothesis # 2. Individuals who have a psychiatric disorder during schooling years will have lower schooling attainment than other those without disorders, *ceteris paribus*.

In the second model, I derive an expression for optimal labor supply as a function of schooling and adult mental health. From this expression, I derive my third and fourth hypotheses:

Hypothesis # 3. Adults who have a psychiatric disorder have a lower probability of labor force participation than individuals without these disorders, *ceteris paribus*.

Hypothesis # 4. Adults who have a psychiatric disorder will have lower labor earnings than individuals without these disorders, *ceteris paribus*.

3.1 Optimal Schooling

In order to investigate the impact of mental health on educational attainment, I employ a traditional human capital model. The mathematical approach to optimal investment in human capital was developed by Gary Becker. Becker's Woytinsky lecture (1967) proposed a complete model that was empirically testable (Nerdrum, 1999, p. 78).

A primary assumption of human capital theory is that investment in human capital leads to higher productivity of workers and thus to higher earnings, *ceteris paribus*. It follows that the marginal productivity of schooling can be measured by wage differentials between individuals with different levels of schooling attainment. Variations in schooling attainment depend on many factors, including differences in student abilities and taste, as well as variations in parental characteristics such as income and schooling.

The theoretical basis for the empirical hypotheses tested in this research is provided by a simple extension of a model of human capital investment by Rosen

(1973) and Griliches (1977). The first part of the discussion is based on the work of Griliches. I begin by assuming that an individual maximizes the present value of his or her wealth (W) at birth. The maximand is

$$W(S) = \int y(S, A, u) \exp^{-r(S+t)} dt , \qquad (3.1)$$

where $Y = y(S, A, u)$ is the expected earnings function. Expected earnings are assumed to depend upon schooling (S), ability (A), and other unobservable factors (u). The unobservable factors are unknown to the researcher but are known to the individual. The individual's rate of time discount is represented by r (the interest rate) and t indicates the time period after the completion of schooling. Earnings are expected to be positive after schooling is completed.

The model is simplified by making several strong assumptions: infinite life, no post-school investment or age effects, a constant rate of interest, foregone earnings as the only cost of schooling, and no subsidies or taxes. Under these assumptions, an individual chooses the optimal level of schooling such that the marginal return to an extra period of schooling would be just equal to the foregone income per unit of time spent on schooling. That is,

$$(\partial Y/\partial S)/r = y(S, A, u) . \qquad (3.2)$$

If the earnings function is specified as

$$\ln Y = \alpha + \beta S + \gamma A + u \qquad (3.3)$$

or

$$Y = \exp [\beta S + \gamma A + u] , \qquad (3.3')$$

then

$$(\partial Y/\partial S) = \beta y(S,A,u) = ry(S,A,u) . \quad (3.4)$$

Thus, we have

$$\beta Y = rY \quad (3.5a)$$

and

$$\beta = r , \quad (3.6)$$

so that the rate of return to a period of schooling (β) is equal to the rate of time discount (r) when the individual chooses the utility-maximizing amount of schooling (S^*).

For a nontrivial function for optimal schooling (S^*), there however needs to be either diminishing returns to human capital accumulation (downward sloping marginal benefit) or increasing costs of borrowing (upward sloping marginal cost).

The marginal cost of financing schooling increases with the amount of schooling to be financed. The marginal cost of financing any investment is typically measured by the rate of interest rate that must be paid to finance an additional dollar of investment. Because increasingly higher interest rates must be paid as more funds are diverted from alternative uses, the marginal cost increases with the amount of schooling that is financed. The marginal benefit of schooling investment decreases with the amount of schooling. As is the case with all production processes, the production of human capital is subject to diminishing marginal increment in human capital such that what the person accrues must eventually decrease. This implies that the individual's marginal benefit from investing in schooling must eventually decrease (Becker, 1993, p. 112).

A nontrivial solution is ensured by assuming that private or public transfers (TR) subsidize the cost of schooling and the cost of schooling is lower for more able individuals. If a person has access to private or public funds to subsidize schooling costs, this will decrease the cost of schooling. An individual with more ability will accumulate more human capital for each dollar of investment, lowering the real cost of schooling per unit of time by δA. Equation (3.5.a) becomes

$$\beta Y = r (Y - TR - \delta A). \quad (3.5b)$$

At this point I introduce the effects of parental and individual mental illness into the model. I hypothesize that both parents' (P) and the individual's own (O) mental illness will cause a decrease in the optimal level of schooling attainment that he/she achieves, *ceteris paribus*. As Richard Freeman writes, "There is a powerful positive relation between one's family background, measured by family income, occupation or education of parents, and schooling. Youths with more advantaged backgrounds go to school more than youths with less advantaged backgrounds" (Freeman, 1986, p. 369).

Bartel and Taubman (1986) argue that illness may cause a change in skills and/or tastes. The former would affect the cost of schooling and the latter would affect the demand for schooling. The impacts on the optimal level of schooling are identical. If parental and individual mental illness causes a lower demand for schooling because the "ability" of individuals to benefit from education is reduced, an individual with a parent's (P) and/or their own (O) psychiatric disorder during schooling years may accumulate less human capital for each dollar of schooling

investment than other individuals. In this case, let ability (A) depend upon parental (P) and the individual's (O) mental illness. Equation (3.5b) above becomes

$$\beta Y = r [Y - TR - \delta A (P, O)] \quad (3.5c)$$

Alternatively, if parental illness reduces the individual's supply of funds available for schooling, this higher cost of schooling causes less schooling investment. In this case, P and I add directly to costs:

$$\beta Y = r [Y - TR - \delta A + \varphi P + \pi O] \quad (3.5d)$$

Allowing for either type of effect, we have

$$\beta Y = r [Y - TR - \delta A (P, O) + \varphi P + \pi O]. \quad (3.5e)$$

For the empirical research reported in this paper, I do not attempt to ascertain the underlying structural relationships and the impact of P and O on the level of r. Rather, I simply test whether parental mental illness causes a decrease in optimal schooling, *ceteris paribus*.[12]

From equation (3.5e) we have

$$Y = r [TR + \delta A (P, O) - \varphi P - \pi O] / [r - \beta]. \quad (3.7)$$

Substituting (3.7) into (3.3') for Y, taking logarithms, and solving for S, the optimal amount of schooling in the extended model is expressed as

$$S^* = (1/\beta)\{-\log ((r - \beta) / r) + \log [TR + \delta A (P, O) - \varphi P - \pi O] - \gamma A (P, O) + \phi P + \pi O\}. \quad (3.8)$$

[12] A decrease in the demand for schooling due to parental mental illness will decrease the rate of return to schooling, while an increase in the cost of schooling will increase the rate of return to schooling. To examine the impact of P and I on the rate of return to schooling, I need to specify independent structural equations for the demand for schooling and the supply of schooling. See the appendix for details.

The partial derivative with respect to parental psychiatric disorders (P) is

$$\partial S^*/\partial P = (1/\beta D)\{[\delta(\partial A/\partial P) + \phi D] - [(\gamma D)(\partial A/\partial P) + \varphi]\}, \quad (3.9)$$

where $D = [TR + \delta A(P, O) - \varphi P - \pi O]$. The sign of (3.9) depends upon the sign of D as well as the relative magnitudes of the two terms enclosed in squared brackets. The presence of both positive and negative terms in (3.9) yields an ambiguous theoretical prediction. For my empirical test, I define the null hypothesis as a negative value of (3.9).

Thus, Hypothesis # 1 is

$$H1_0 : \partial S^*/\partial P < 0 .$$

The alternative hypothesis is

$$H1_A : \partial S^*/\partial P \geq 0 .$$

The effect of parental mental illness as represented by H_0 is illustrated in Figure 3.1. If parental mental illness disrupts the family environment, reducing schooling ability and making schooling costlier for the children, then the curves representing the demand for schooling and the supply of schooling both shift to the left. The individual chooses less schooling (at a lower rate of return), *ceteris paribus*. Alternatively, H_A implies that supply and demand are unaffected or that the curves shift to the right, causing no change or an increase in schooling, respectively.

The partial derivative of S* with respect to the individual's own psychiatric illness (O) is:

$$\partial S^*/\partial O = (1/\beta D)\{[\delta(\partial A/\partial O) + \phi D] - [(\gamma D)(\partial A/\partial O) + \pi]\}, \quad (3.10)$$

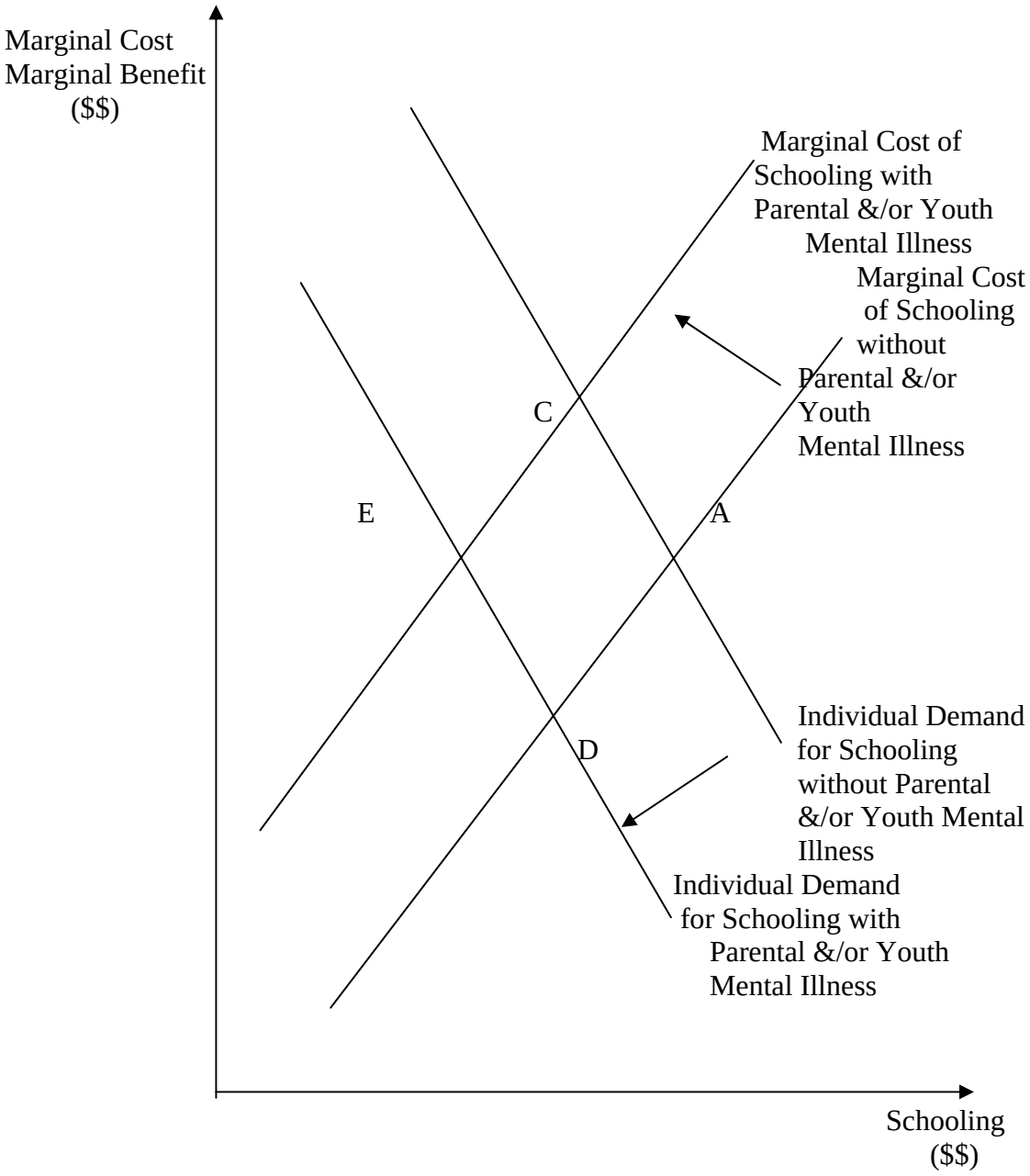

Figure 3.1 The Impact of Parental &/or Individual's Mental Disorders on Schooling

where $D = [TR + \delta A(P, O) - \varphi P - \pi O]$. The sign of (3.10) depends upon the relative magnitudes of the two terms enclosed in brackets as well as the sign of D. Similar to the parental mental illness effect on schooling, the effect of the individual's own mental illness is ambiguous. For my empirical test, I define the null hypothesis as a negative value of (3.10).

Thus, Hypothesis #2 is

$$H2_0 : \partial S^*/\partial O < 0 .$$

And the alternative hypothesis is $$H2_A : \partial S^*/\partial O \geq 0 .$$

If the individual's mental illness during schooling years reduces ability and makes schooling more costly, then the curves representing the demand for schooling and the supply of schooling both shift to the left. The individual chooses less schooling, *ceteris paribus*. Alternatively, H_A implies that supply and demand is unaffected or that the curves shift to the right, causing no change or an increase in schooling, respectively.

3.2 Optimal Labor Supply

Traditionally, labor economists assume that an individual determines his/her optimal labor supply by maximizing utility, subject to budget and time constraints. Like any other aspect of human capital, an individual invests in health production up to the point at which the marginal benefit of added investment equals the marginal cost. By investing in health, an individual may increase the quality and length of his/her economic life. Investing in health reduces the sick days and leaves more days

available for individuals to allocate between leisure, household production, and market work activities per year.

Figure 3.2 presents a diagram illustrating time allocation choices made by each person. An individual has OT (365) days available to allocate optimally between three activities: market work, health care production, and leisure activities. To simplify the model, I include household activities other than health production in leisure time. The healthy person with health care production function of AB and total resources in market and at home of OD initially maximizes satisfaction at point Q. On the budget line of DEBT, the healthy person allocates OL days to leisure activity (and other household production), LHe days for market work, and HeT days for health care production.

The onset of poor health will cause an increase in time required for health production (He'T) and a decrease in hours available for all other activities (HeHe'). If the time spent in health care is productive, the health production function makes a clockwise rotation (A'B') and becomes steeper at all units of time and the utility-maximizing tangency moves from Q to either Q' or Q". We are interested in determining the time allocation for supply of market work in case of increasing time for health care production due to the mental illness. There are different case possibilities which all lead to reallocation of time devoted to each activity. The net effect depends on the magnitude of substitution effect between leisure and labor market work and the magnitude of health care productivity output. Therefore, the sign of $(\partial h / \partial MI_0)$ theoretically is indeterminate and should be determined empirically.

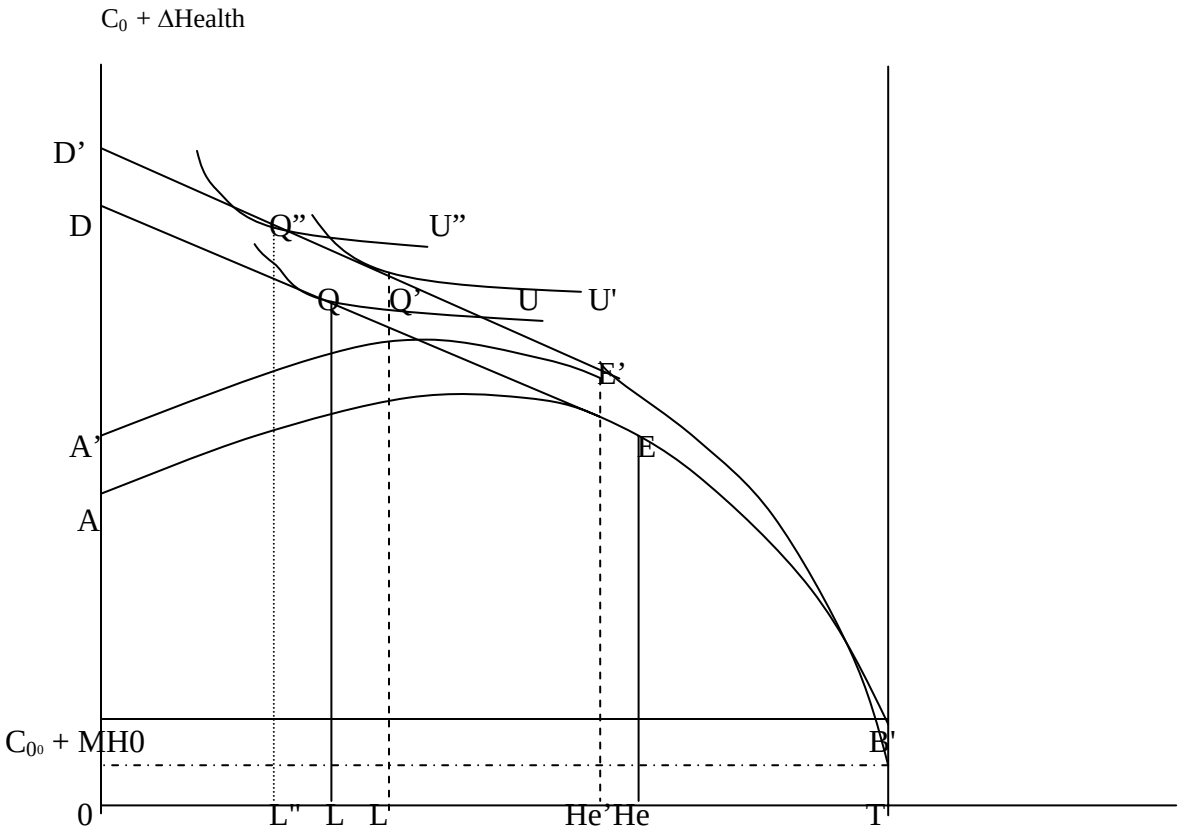

Figure 3.2. Time Allocation for an Ill Person

If the sick person increases leisure due to pure health productivity output effect, the tangency point becomes Q'and he/she has less time available for market work. The sick person demands more leisure (OL' days) and fewer consumptiongoods up to the point that the slope of indifference curve is equal to the slope of the new budget line (where $MU_{C0} / P_0 = MU_{CM} / P_M = MUL / W = MU_M / W$). Therefore, the sick person with new budget line of D'E'B'T (with higher resources of OD') maximizes satisfaction at point Q' on new indifference curve U' (Figure 3.2). In this case, as the time spent on leisure increases (or stays constant), the time spent on market work declines from LHe to L'He'.

Alternatively, because poor health may increase expenditures for market goods used on health production, the person may choose to work more hours (even as time spent on health production increases). In this case, the new tangency point is Q", so that the net impact on hours of market work will be negative only if the increase in market work hours (L to L"), due to the increased demand for market goods for health production, is dominated by the decrease in market work hours (He to He'), due to the increase in time for health production. These choices can be expressed in a constrained utility-maximization model. The individual maximizes utility, which is a function of consumption, leisure (including non-health household production), and current health status (MH),

$$\text{Max} \quad U(C_0, L, MH), \tag{3.10}$$

subject to the following budget and time constraint and health production function:

$$Y = P_0 C_0 + P_M C_M = Wh + V, \tag{3.11}$$

$$h + L + M = T, \tag{3.12}$$

and

$$MH = s(M, C_M, MH_0), \tag{3.13}$$

where C_0 = consumption of non-health related goods and services, C_M = input of health-related goods and services, P_0 = price per unit of C_0, P_M = price per unit of C_M, L = time spent on leisure and other household production (non-labor activity other than health production), T = total time available, V = unearned income, W = individual's hourly wage rate, Y = total income, h = hours of work, and MH = current mental health status. MH is produced as a function of the hours spent in health care (M), health-related consumption (C_M), and the initial health status (MH_0).

We assume that:

$(\partial U/\partial MH > 0)$, $(\partial U/\partial C_0 > 0)$, $(\partial U/\partial L > 0$, $(\partial M/\partial MH_0 < 0$.

Because the initial health status (MH_0) is exogenous, the individual can produce changes in mental health status only by changing the hours spent on health care (M) and the level of health-related market goods and services (C_M). Therefore, using the utility transformation function, equation (3.10) is simplified to:

$$\text{Max} \quad \text{⅄}(C_0, C_M, L, M) \qquad (3.14)$$

The utility transformation function (3.14), maximized subject to the budget and time constraints, yields:

$$\zeta_{C0,\, CM,\, L,\, M} = \text{⅄}(C_0, C_M, L, M) + \lambda(Wh + V - P_0C_0 - P_MC_M) \qquad (3.15)$$

Replacing $h = T - L - M$ in (3.15) and transforming yields:

$$\zeta_{C0,\, CM,\, h,\, M} = \text{⅄}(C_0, C_M, L + M) + \lambda(W(T - L - M) + V - P_0C_0 - P_MC_M) \qquad (3.16)$$

where L and M (or h) are choice variables and T, V, P_0, P_M, and W are exogenous. The first order conditions are:

$$\partial\zeta/\partial C_0 = \partial U/\partial C_0 - \lambda P_0 = 0 \rightarrow \quad \lambda = 1/P_0\,(\partial U/\partial C_{0)} \qquad (3.17)$$

$$\partial\zeta/\partial C_M = \partial U/\partial C_M - \lambda P_M = 0 \rightarrow \quad \lambda = 1/P_M\,(\partial U/\partial C_{M)} \qquad (3.18)$$

$$\partial\zeta/\partial L = \partial U/\partial L - \lambda W = 0 \rightarrow \quad \lambda = 1/W\,(\partial U/\partial L) \qquad (3.19)$$

$$\partial\zeta/\partial M = \partial U/\partial M - \lambda W = 0 \rightarrow \quad \lambda = 1/W\,(\partial U/\partial M) \qquad (3.20)$$

$$\partial\zeta/\partial\lambda = W(T - L - M) + V - P_0C_0 - P_MC_M = 0 \rightarrow$$

$$\Rightarrow \quad \partial\zeta/\partial\lambda = W(T - L - M) + V - P_0C_0 - P_MC_M = 0 \qquad (3.21)$$

Assuming an interior solution:

$L > 0$, $M > 0$, $C_0 > 0$, $C_M > 0$

The equality of equations (3.17), (3.18), (3.19), and (3.20) indicates that the marginal utility per dollar spent on consumption goods is equal to the marginal utility per dollar spent on medical expenditures and the marginal utility of the final dollar spent on leisure L and health care (M), $MU_{C0} / P_0 = MU_{CM} / P_M = MU_L / W = MU_M / W$

This equality is represented by point Q in Figure 3-2. Equation (3.21) states that the total expenditure on consumption is exactly equal to earned and unearned income, V + Wh. At point Q the slopes of the budget line and indifference curve U_2 are equal, $-MU_h / MU_{C0} = -MU_h / MU_{CM} = W / P_0 = W / P_M$. This implies that at the optimum point, $MU_L / W = MU_M / W = MU_{C0} / P_0 = MU_{CM} / P_M$, the individual's indifference curve is tangent to the budget line.

Next, I consider the impact of poor mental health on work-hours. This is derived by considering the net impact on leisure (L) and health production time (M). Assuming that P_0, P_M, W, and V are fixed, then totally differentiating the first order condition (3.20) yields:

$$U_{M,c_0}\, dC_0 + U_{M,CM}\, \partial C_M/\partial MH_0 + U_{M,L}\, \partial L/\partial MH_0 + U_{M,M}\, \partial M/\partial MH_0 - W\, d\lambda_1 = 0 \qquad (3.20')$$

Rearranging (3.20') and solving for $\partial M / \partial MI_0$ yields:

$$\partial M/\partial MH_0 = (-UL,c_0\, dC_0 - UL_{,CM}\, \partial C_M/\partial MH_0 - U_{L,L}\, \partial L/\partial MH_0 + W\, d\lambda_1)U_{L,M}$$

The signs for the first three terms are negative. The sign for the fourth term is, however, positive and therefore, the sign for the whole term is not determinate. Intuitively, the positive term implies that the onset of mental illness requires more time spent on health care. The negative term indicates that an ill person might have a

greater need for market inputs, which are costly. This increases the utility derived from an hour of work and decreases M.

We assume that in most instances $(\partial M / \partial MH_0) < 0$, so that poorer mental health causes an increase in hours of health production. The net effect of a decrease in MH then depends upon the sign of $\partial L/\partial MH_0$. If $\partial L / \partial MH_0 = 0$, then $\partial h /\partial MH_0 > 0$. The expression for $\partial L/\partial MH_0$ is derived from (3.20).

The sign of $\partial L / \partial MH_0$ is ambiguous. Assuming $\partial M / \partial MH_0 < 0$, $\partial L / \partial MH_0 < 0$ implies:

$$\partial h /\partial MH_0 = \underset{(-)}{\partial h / \partial L} \underset{(-)}{\partial L / \partial MH_0} + \underset{(-)}{\partial h /\partial M} \underset{(-)}{\partial M / MH_0} > 0. \qquad (3.22)$$

For $\partial L / \partial MH_0 > 0$, however, the net effect on hours of work is ambiguous:

$$\partial h /\partial MH_0 = \underset{(-)}{\partial h / \partial L} \underset{(+)}{\partial L / \partial MH_0} + \underset{(-)}{\partial h /\partial M} \underset{(-)}{\partial M / MH_0} > = < 0. \qquad (3.23)$$

Poor health will cause hours of work to decrease only if

$|\partial h / \partial L \, \partial L / \partial MH_0| > |\partial h /\partial M \, \partial M / MH_0|$.

This condition is represented in Figure 3.2 by |LL"| < |HeHe"|. Thus, the net effect on the hours of labor work depends on the magnitude of the substitution effect between leisure and labor market activities and the magnitude of health production output.

For our null hypothesis, we assume that the net impact of poor mental health is to decrease an individual's labor supply compared to a healthy person:

Thus, Hypothesis # 3 is

$$H_{30}: (\partial h / \partial MH_0) > 0$$

The alternative hypothesis is $H_{3A}: (\partial h / \partial MH_0) \leq 0$

Assuming the wage rate is constant, H_{3A} implies that poor mental health will also decrease earnings:

Thus, Hypothesis # 4 is

$$H_{40}: \quad \partial Y / \partial MH_0 > 0.$$

The alternative hypothesis is

$$H_{4A}: \partial Y / \partial MH_0 \leq 0.$$

CHAPTER 4

EMPIRICAL METHODS

These sections present the empirical analyses designed to test the four hypotheses developed in Chapter 3. First, the data will be described. Next, I will discuss the endogeneity of mental disorders and labor market outcomes. To neutralize the endogeneity bias, I use several types of multivariate analysis to estimate the model: Logistic analysis, Ordinary least squares regression, and Tobit regression as well as instrumental variable (IV) versions of these techniques. This technique allows me to distinguish the direct effect of psychiatric disorders on labor market outcomes.

4.1 Description of the Data

The data used in this study are drawn from the National Comorbidity Survey (NCS). The NCS was conducted between September 1990 and February 1992 (Kessler et al., 1995). This is the first survey to administer a structured psychiatric interview based on a stratified, multistage nationally representative sample design. The NCS interviewed individuals between the ages of 15 and 54 in the non-institutionalized civilian population (including students living in group housing) in the 48 contiguous states of the United States. The interview data contain two parts. Part I, the core interview, was administered to all 8098 respondents. Part II, a series of diagnostic questions, was administered to a sub-sample of 5,877 respondents.

Using observations of individuals who responded to both parts of the survey, but restricting the age range to 19 to 54 and dropping observations with missing data, reduces my study sample to 3389 observations. For labor market outcomes, I also drop observations for students, the disabled, and the retired, to obtain an unbiased estimation of labor force participation rates. This reduces the study sample to 2623 observations.

The NCS was designed to be administered in face-to-face in-home interviews by trained non-clinicians (Kessler, Stang, Stein, & Walters, 1999). The interview permits assessment of broad categories of affective/anxiety/substance abuse and dependence disorders following the International Classification of Diseases (ICD-10).

In this study I examine the life-cycle impact of four major types of mental disorders (mood, anxiety, alcohol, and drug disorders) on the probability of high school dropout rate and labor market outcomes. These subgroups of disorders are the major groupings used in DSMIII-R.[13] I am examining these disorders for two reasons. These mental disorders are the most prevalent among the American population. Moreover, there is a high incidence of comorbidity among these psychiatric disorders. In addition, these disorders are highly treatable with drug and behavioral therapy at relatively low cost.

This interview comprises a series of questions about the history of a respondent's psychiatric and related disorders including major depression, dysthymia,

[13] "The Diagnostic Statistical Manual (DSM) is published by the American Psychiatric Association (1994) and used by both mental health providers and the criminal justice system to provide standard criteria for defining psychiatric disorders" (Ettner et al. 1997, p. 66).

mania, generalized anxiety disorder, panic disorder, simple phobia, social phobia, agoraphobia, alcohol abuse, alcohol dependence, drug abuse, and drug dependence. The number of affected respondents for schizophrenia and other affective psychoses was so small and comorbid with other disorders that it was difficult to estimate stable coefficients for these types of illnesses (Kessler et al., 1995).

The questions also cover parental mental illnesses such as major depression, generalized anxiety (nervousness) disorder,[14] alcohol, drug dependence/abuse[15] and antisocial personality disorders.[16] Other parental mental disorders are not reported.

Use of the NCS data allows me to estimate empirical models that include sociodemographic variables, as well as variables that represent the parents' and the individual's psychiatric disorders. The NCS data contain information about (1) the respondents' characteristics, such as race, gender, age, and mental and physical health, and (2) family characteristics, such as parents' income, education, and mental illness,

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[14] Shaffer et al. (1999) state that depression and anxiety refers to a set of symptoms that usually are classified together. "Depression is negative effect, loss of interest in activities, feelings of worthlessness, changes in appetite" (p.128). And "generalized anxiety disorder is characterized by excessive anxiety and worry in areas such as future events and past behavior, as well as physiological complaints" (p.129).

[15] The diagnosis for major depression was based on a series of question such as: whether a parent was depressed for two weeks or more, loss of energy, appetite, feeling worthless, etc. For generalized anxiety disorder the diagnosis was based on questions such as whether a parent was constantly anxious, nervous, had difficulty falling asleep, was restless, irritable, worried about the future and so on. The respondents of the NCS have reported parental depression and anxiety disorder in three cases: 1) interferes with life 2) under treatment and 3) hospitalization (narrower case). This study considers parental disorder, which has been reported by their children as interfering with life and or hospitalized (narrower case). For alcohol and drug dependence abuse, the question asked was whether the parent had problems with drinking (ALCOHOL-DAD, and ALCOHOL-MOM) and whether the parent had problems with illegal drugs (DRUG-DAD and DRUG-MOM)

[16] Due to the small number of parents with antisocial personality disorder in our sample size, the convergence for this variable did not attain and therefore was eliminated from the study.

family structure, language spoken in the home, number of siblings, rural residency, and number of times the person moved during childhood.

The dependent variables in my analyses are high school dropout, labor force participation, and earnings. The details available in the data allows me to control for many of the confounding factors that may influence the dependent variables, so I am able to identify the effects of mental illness on the probability of dropping out of high school and on adult labor market outcomes. The variables include 23 sociodemographic factors, four parental psychiatric disorders, five mental disorders of the individual during schooling years, and four types of current and lifetime psychiatric disorders.

4.2 Estimating Models

The objectives of this study are: (1) to examine the relationship between parental psychiatric disorders, the individual's school age psychiatric disorders, and the probability of high school dropout; and (2) to examine the relationship between psychiatric disorders and labor market outcomes.

Previous studies have indicated that the causal correlation between health and schooling may run from schooling to health and/or from health to schooling and/or from unobserved third factors (individuals' physical and mental ability and parental characteristics such as education) to both health and schooling (e.g., Grossman 1975, p. 148). Many studies have found that strong schooling performance improves health by decreasing depression, anxiety, and psychological distress. On the other hand, school culture (embodied in the different social activities at different schools) has a

beneficial effect on health, lifestyle, healthy habits such as drinking, smoking, participation in athletic activities, and other behaviors that affect health, even after controlling for factors such as age, sex, race, marital status, and parental education (e.g., Ross and Mirowsky, 1999).

Similarly, in the labor market, many studies have found a high positive correlation between social class and mental health. A number of studies have suggested that unemployment and low SES causes psychological distress (Kessler, 1982). On the other hand, some studies have found that there is a negative impact of mental disorders on labor market performance (e.g. Bartel and Taubman, 1986; Ettner, Frank, and Kessler, 1997; and Marcotte, Wilcox-Gök, & Redmon (2000). Since health and schooling (and/or labor market outcomes) are determined simultaneously and all the endogenous variables are random variables, a change in any disturbance term changes all the endogenous variables. This implies that the endogenous variables used as regressors are correlated with the disturbance term in all the equations. The character of the simple regression estimator in this context depends on whether or not the endogenous variables used as regressors are distributed independently of the disturbance term in that equation. Since all the endogenous variables are determined simultaneously, if the disturbance term changes, it changes all the endogenous variables. If poor school performance and social status affect mental health, then assuming only that mental health affects schooling and/or labor market outcomes may bias the estimated coefficient for mental illness. The simple regression model will

overstate the effect of mental disorders, so an alternative estimator is usually necessary.[17]

To test for the presence of endogeneity, I perform Hausman-Wu tests. If I am unable to reject the possibility of endogeneity, I use (when possible) an instrumental variable (IV) in my analysis to obtain consistent estimates of the effects of mental illness. When IV estimation is not possible, I discuss the probable bias in the results. IV is possible for the analyses of labor market outcomes. Parental mental illness and individual's mental disorders during schooling years (before entering into the labor market) are used as identifying variables to predict lifetime and current mental disorders. The predicted mental disorder variables are used as IVs in my analysis to estimate the direct effect of mental disorders on labor force participation and earnings.

For each of my analyses, I begin by estimating a single-equation model. The single-equation model is compared (when appropriate) with models that control for the endogeneity of mental disorders.

4.3 Mental Disorders and High School Dropout

4.3.1 Parental Mental Disorders and High School Dropout

The first hypothesis derived from my theoretical model states that parental mental illness would have a negative impact on schooling, *ceteris paribus*. My measure of schooling attainment is a dummy variable indicating whether the

[17] Kennedy (1996, p151).

individual dropped out of high school (DROPOUT).[18] Because DROPOUT is dichotomous I use a logistic model to estimate the effect of parental mental disorders on the probability of high school dropout.

The theoretical hypothesis assumes that other factors influencing schooling attainment other than parental mental disorders are constant. To control for these other factors in our estimating model, I include explanatory variables common to models in the schooling literature plus variables indicating the presence (or absence) of parental psychiatric disorders. I also control for the respondent's own history of mental illness during the first 18 years of his/her life, so that the effects of parental mental illness are not confused with the effects of the individual's own mental illness.

I assume that children's school performance has no effect on parental mental disorders, so those children's school dropout is influenced by exogenous variables such as family socioeconomic and mental health background.

The general specification for the logit analysis is

$$DROPOUT = f(C, F, E, P, O), \qquad (4.1)$$

where DROPOUT = 1 if the individual failed to complete high school, and
= 0 if the individual completed high school;
C is a vector of individual characteristics;
F is a vector of family characteristics;
E is a vector of variables representing other exogenous factors.
P is a vector of variables representing parental mental illness;
O is a vector of variables representing the individual's own

[18] High school dropout is defined as completing fewer than 12 years of schooling. We do not have information pertaining to the possibility that an individual obtains a graduate equivalency degree. Presumably, as individuals grow older, their schooling choices are less influenced by parental characteristics. See Orazem and Tesfatsion (1993). Our study focuses on the impact of parental characteristics on children of schooling age.

mental illness; and

more specifically the logistic function for DROPOUT for person i is as follows:

$$\begin{aligned} DROPOUT_i = {} & \alpha_0 + \beta_1 (AGE) + \beta_2 (AGE2) + \beta_3 (GOOD\ HEALTH) + \beta_4 (BLACK) \\ & + \beta_5 (HISPANIC) + \beta_6 (OTHRACE) + \beta_7 (PROTESTANT) \\ & + \beta_8 (OTHERRELIGION) + \beta_9 (NO\ RELIGION) + \beta_{10} (ENGLISH) \\ & + \beta_{11} (INTACT\ FAMILY) + \beta_{12} (PARENT\text{-}EDUCATION) \\ & + \beta_{13} (BETTER\ THAN\ AVG) + \beta_{14} (WORSE\ THAN\ AVG) \\ & + \beta_{15} (SINLINGS) + \beta_{16} (MOVED) + \beta_{17} (RURAL) \\ & + \beta_{18} (MIDWEST) + \beta_{19} (NEAST) + \beta_{20} (WEST) \\ & + \beta_{21} (MAX\text{-}UEMPLOYMENT) + \beta_{22} (MIN\text{-}UEMPLOYMENT) \\ & + \beta_{23} (VIETNAM)) + \beta_{24} (I\text{-}DEPRESSION\text{-}DAD) \\ & + \beta_{25} (I\text{-}DEPRESSION\text{-}MOM) + \beta_{26} (I\text{-}ANXIETY\text{-}DAD) \\ & + \beta_{27} (I\text{-}ANXIETY\text{-}MOM) + \beta_{28} (ALCOHOL\text{-}DAD) \\ & + \beta_{29} (ALCOHOL\text{-}MOM) + \beta_{30} (DRUG\text{-}DAD) + \beta_{31} (DRUG\text{-}MOM) \\ & + \beta_{32} (YOUTH\ DISORDER) + \xi_i, \end{aligned} \qquad (4.1')$$

where I-DEPRESSION-DAD, I-DEPRESSION-MOM, I-ANXIETY-DAD, and I-ANXIETY-MOM represent the father's major depression, the mother's major depression, the father's anxiety disorders and the mother's anxiety disorders that interfered with the life of respondent i during schooling years. ALCOHOL-DAD, ALCOHOL-MOM, DRUG-DAD, and DRUG-MOM represent the father's alcohol dependence/abuse, the mother's alcohol dependence/abuse, the father's drug dependence/abuse, and the mother's drug dependence/abuse, respectively. All variables are defined in Tables 4.1 through 4.4 and discussed in section 4.5 below.

In addition to the measures of parental depression and anxiety disorders that interfered with life, I consider measures of these disorders that required hospitalization of parent (H-DEPRESSION-DAD, H-DEORESSION-MOM, H-ANXIETY-DAD, H-ANXIETY-MOM), more severe cases of these disorders. Using these two measures

of parental psychiatric disorders allows me to relate high school dropout to the severity of parental psychiatric disorders.

$H1_0$ implies that the coefficient estimates for the parental mental illness variables will be negative. Alternatively, $H1_A$ implies that these coefficient estimates will be positive or zero.

4.3.2 Youth Mental Disorders and High School Dropout

The second hypothesis derived from my theoretical model states that adolescent mental illness will have a negative impact on schooling attainment, *ceteris paribus*. My measure of schooling attainment is DROPOUT and once more I use logistic analysis. To investigate the presence of endogeneity, I perform Hausman-Wu tests. The results of the Hausman-Wu test indicate that for women there is significant endogeneity between the probability of high school dropout and mood, alcohol, and drug disorders (at value < 0.05). The results however do not indicate that there is significant endogeneity between the probability of high school dropout and mental disorders for men.

Because I do not have an exogenous instrumental variable available for that analysis of high school dropout, I can only use simple logistic analysis for estimating the impact of the individual's mental illness on the probability of high school dropout. Because the Hausman-Wu tests indicated that for women there is endogeneity, the coefficient estimates of the psychiatric disorder variables may be biased.

The simple logistic function for DROPOUT for person i is as follows:

$$DROPOUT_i = \alpha_0 + \beta_1 (AGE) + \beta_2 (AGE2) + \beta_3 (GOOD\ HEALTH) + \beta_4 (BLACK) + \beta_5 (HISPANIC) + \beta_6 (OTHRACE) + \beta_7 (PROTESTANT) + \beta_8 (OTHERRELIGION) + \beta_9 (NO\ RELIGION) + \beta_{10} (ENGLISH) + \beta_{11} (INTACT\ FAMILY) + \beta_{12} (PARENT\text{-}EDUCATION) + \beta_{13} (BETTER\ THAN\ AVG) + \beta_{14} (WORSE\ THAN\ AVG) + \beta_{15} (SINLINGS) + \beta_{16} (MOVED) + \beta_{17} (RURAL) + \beta_{18} (MIDWEST) + \beta_{19} (NEAST) + \beta_{20} (WEST) + \beta_{21} (MAX\text{-}UEMPLOYMENT) + \beta_{22} (MIN\text{-}UEMPLOYMENT) + \beta_{23} (VIETNAM)) + \beta_{24} (I\text{-}DEPRESSION\text{-}DAD) + \beta_{25} (I\text{-}DEPRESSION\text{-}MOM) + \beta_{26} (I\text{-}ANXIETY\text{-}DAD) + \beta_{27} (I\text{-}ANXIETY\text{-}MOM) + \beta_{28} (ALCOHOL\text{-}DAD) + \beta_{29} (ALCOHOL\text{-}MOM) + \beta_{30} (DRUG\text{-}DAD) + \beta_{31} (DRUG\text{-}MOM) + \beta_{32} (MOOD\text{-}YTH) + \beta_{33} (ANXIETY\text{-}YTH) + \beta_{34} (ALCOHOL\text{-}YTH) + \beta_{35} (DRUG\text{-}YTH) + \beta_{36} (CONDUCT) + \xi_i, \quad (4.1')$$

where MOOD-YTH, ANXIETY-YTH, ALCOHOL-YTH, DRUG-YTH, and CONDUCT represent respondent's mood, anxiety, alcohol, drug dependence/abuse, and conduct disorders during the schooling years, respectively.

$H2_0$ implies that the coefficient estimates of the five mental illness indicator variables will be negative. Alternatively, $H2_A$ implies that these coefficient estimates will be positive or zero.

4.4 Mental Disorders and Labor Market Outcomes

The third and fourth hypotheses derived from my theoretical model state the individual's adult mental illness will have a negative impact on the probability of labor force participation rate and earnings, *ceteris paribus*. I use logistic analysis when labor force participation is the dependent variable and ordinary least squares and Tobit regression analyses when earnings is the dependent variable. I begin by estimating single-equation models. When the Hausman-Wu test indicates that there is

endogeneity between mental disorders and the dependent variable, I estimate an instrumental variable model.

The results of the Hausman-Wu tests indicate that there is significant endogeneity between the probability of labor force participation and all four types of adult mental disorders for both men and women. Using parental mental disorders (controlling for the two cases in which parental mental illness interferes with life and hospitalization) and youth mental illness to identify instrumental variables, I estimate the IV model to obtain the direct effect of lifetime and current psychiatric disorders on the probability of labor force participation rate and earnings. I then compare the results of instrumental variable estimation with simple logistic and OLS estimation.

Ettner, Frank, and Kessler (1997) and Marcotte, Wilcox-Gök, and Redmon (2000) use a similar IV estimation method. This study, however, extends these prior studies in two ways. First, by using parental mental illness in two cases (interferes with life and with hospitalization), I can choose more robust instrumental variables for current and lifetime mental disorders. Second, I investigate the impacts of four major mental disorders[19] on labor force participation rates and earnings.

In the remainder of this section, I describe the estimating models, the explanatory variables used in these models, and the expected sign of each coefficient.

[19] Since these four mental disorders are the most prevalent mental disorders among the United States population, we can assume the reference category is people without mental illnesses.

4.4.1 Mental Disorders and Labor Force Participation

The labor force participation rate (LFP =1) is only defined for individuals in the labor force who are employed by others, so the self-employed and students are eliminated for this analysis. I also drop individuals in my sub-sample that are disabled and retired, leaving 1417 female and 1206 male observations for this analysis.

A logistic analysis is used to examine labor force participation. It is defined as follows:

$$\begin{aligned} LFP_i = \alpha_0 &+ \beta_1 (\text{MOOD-LIFE}) + \beta_2 (\text{ANXIETY-LIFE}) + \beta_3 (\text{ALCOHOL-LIFE}) \\ &+ \beta_4 (\text{DRUG-LIFE}) + \beta_5 (\text{AGE}) + \beta_6 (\text{AGE2}) + \beta_7 (\text{GOOD HEALTH}) \\ &+ \beta_8 (\text{BALCK}) + \beta_9 (\text{HISPANIC}) + \beta_{10} (\text{OTHRACE}) + \beta_{11} (\text{PROTESTANT}) \\ &+ \beta_{12} (\text{OTHERRELIGION}) + \beta_{13} (\text{NO RELIGION}) + \beta_{14} (\text{ENGLISH}) \\ &+ \beta_{15} (\text{INTACT FAMILY}) + \beta_{16} (\text{PARENT-EDUCATION}) + \beta_{17} (\text{SIBLINGS}) \\ &+ \beta_{18} (\text{MOVED}) + \beta_{19} (\text{RURAL}) + \beta_{20} (\text{NORTHEAST}) + \beta_{21} (\text{MIDWEST}) + \\ &\beta_{22} (\text{WEST}) + \beta_{23} (\text{MARRIED}) + \beta_{24} (\text{HOUSEHOLDSIZE}) \\ &+ \beta_{25} (\text{DROPOUT}) + \beta_{26} (\text{COLLGE}) + \beta_{27} (\text{SOMECOLGE}) \\ &+ \beta_{28} (\text{COLGPLUS}) + \beta_{29} (\text{SPOUSEINCOME}) + \beta_{30} (\text{ASSETS}) + \xi i, \end{aligned} \quad (4.3)$$

where MOOD-LIFE, ANXIETY-LIFE, ALCOHOL-LIFE, and DRUG-LIFE are the dichotomous variables representing the individual's lifetime psychiatric disorders.

4.4.2 Mental Disorders and Annual Income

Since the National Comorbidity Survey does not provide the earnings of respondents, I have used personal income as a proxy for earnings. To reduce measurement error in this earnings proxy, I drop self-employed and disabled people, as well as students, from the sample.

I use a censored regression, or Tobit model, with lifetime (or current) mental disorders among the dependent variables. The analysis is conditional on having

income greater than zero. Because the distribution of income is censored at zero, a Tobit model is appropriate. I drop those individuals who have zero income, leaving us with 961 females and 1045 males for this analysis.

Many of the explanatory variables are those used in the logit model of labor force participation. My primary interest is in estimating the coefficients of the mental illness variables as they indicate the impact of the mental disorders on restricted income, *ceteris paribus*.

The Tobit equation is defined as follows:

$$\begin{aligned}\text{INCOMER} = \alpha_0 &+ \beta_1 (\text{MOOD-LIFE}) + \beta_2 (\text{ANXIETY-LIFE}) + \beta_3 (\text{ALCOHOL-LIFE}) \\ &+ \beta_4 (\text{DRUG-LIFE}) + \beta_5 (\text{AGE}) + \beta_6 (\text{AGE2}) + \beta_7 (\text{GOOD HEALTH}) \\ &+ \beta_8 (\text{BALCK}) + \beta_9 (\text{HISPANIC}) + \beta_{10} (\text{OTHRACE}) + \beta_{11} (\text{PROTESTANT}) \\ &+ \beta_{12} (\text{OTHERRELIGION}) + \beta_{13} (\text{NO RELIGION}) + \beta_{14} (\text{ENGLISH}) \\ &+ \beta_{15} (\text{INTACT FAMILY}) + \beta_{16} (\text{PARENT-EDUCATION}) + \beta_{17} (\text{SIBLINGS}) \\ &+ \beta_{18} (\text{MOVED}) + \beta_{19} (\text{RURAL}) + \beta_{20} (\text{NORTHEAST}) + \beta_{21} (\text{MIDWEST}) \\ &+ \beta_{22} (\text{WEST}) + \beta_{23} (\text{MARRIED}) + \beta_{24} (\text{HOUSEHOLDSIZE}) \\ &+ \beta_{25} (\text{DROPOUT}) + \beta_{26} (\text{COLLGE}) + \beta_{27} (\text{SOMECOLGE}) \\ &+ \beta_{28} (\text{COLGPLUS}) + \beta_{29} (\text{SPOUSENICOME}) + \beta_{30} (\text{ASSETS}) + \xi i, \quad (4.4)\end{aligned}$$

All variables are defined in Tables 4.1 through 4.4 and are discussed in section 4.5 below.

4.4.3 Instrumental Variables Estimation

Because mental illness and labor force outcomes are endogenous, I estimate the models relating adult mental illness and LFP and income using instrumental variables. The results are compared to those obtained from the simple logistic and Tobit analyses described in 4.4.1 and 4.4.2.

To obtain instrumental variables for the mental illness variables in equations 4.3 and 4.4, I predict the probabilities of adult psychiatric disorders using information

describing the parents' mental illness history and the respondent's school age mental illness history. The explanatory variables included are those that have been traditionally found to have an effect on mental illnesses, with the addition of variables indicating the presence (or absence) of mentally ill parents and the respondent's mental disorder during schooling years (YOUTH DISORDER). The logit equation is defined as follows:

$$\begin{aligned}\text{MOOD-LIFE}_i = {} & \alpha_0 + \beta_1\,(\text{AGE}) + \beta_2\,(\text{AGE2}) + \beta_3\,(\text{GOOD HEALTH}) \\ & + \beta_4\,(\text{BLACK}) + \beta_5\,(\text{HISPANIC}) + \beta_6\,(\text{PROTESTANT}) \\ & + \beta_7\,(\text{OTHERRELIGION}) + \beta_8\,(\text{NO RELIGION}) + \beta_9\,(\text{ENGLISH}) \\ & + \beta_{10}\,(\text{INTACT FAMILY}) + \beta_{11}\,(\text{PARENT-EDUCATION}) \\ & + \beta_{12}\,(\text{BETTER THAN AVG}) + \beta_{13}\,(\text{WORSE THAN AVG}) \\ & + \beta_{14}\,(\text{SIBLINGS}) + \beta_{15}\,(\text{MOVED}) + \beta_{16}\,(\text{RURAL}) \\ & + \beta_{17}\,(\text{MIDWEST}) + \beta_{18}\,(\text{NORTHEAST}) + \beta_{19}\,(\text{WEST}) \\ & + \beta_{20}\,(\text{I-MOOD-DAD}) + \beta_{21}\,(\text{I-MOOD-MOM}) + \beta_{22}\,(\text{I-ANXIETY-DAD}) \\ & + \beta_{23}\,(\text{I-ANXIETY-MOM}) + \beta_{24}(\text{ALCOHOL-DAD}) \\ & + \beta_{25}\,(\text{ALCOHOL-MOM}) + \beta_{26}\,(\text{YOUTH DISORDER}) + \xi i^{20}, \quad (4.2)\end{aligned}$$

where MOOD-LIFE represents lifetime mood disorders for person i. Similarly, we repeat the regression with three other mental disorders: I-ANXIETY-LIFE, ALCOHOL-LIFE, and DRUG-LIFE (where I-ANXIETY-LIFE, ALCOHOL-LIFE, and DRUG-LIFE represent the lifetime anxiety, lifetime alcohol dependence abuse, and lifetime drug dependence abuse). I-DEPRESSIOM-DAD, I-DEPRESSION-MOM, ANXIETY-DAD, ANXIETY-MOM, ALCOHOL-DAD, ALCOHOL-MOM, and YOUTH DISORDER are included as additional regressors to capture best the factors that produce mental disorders. For comparison purposes, I also predict the four lifetime disorders using a consolidated measure of parental illness (I-DAD-DISORDER, I-MOM-DISORDER, H-DAD-DISORDER, H-MOM-DISORDER) and

[20] DRUGFATH, DRUGMOTH, and OTHRACE eliminated from model because cell size precluded convergence.

YOUTH DISORDER. (In Appendix Table A.4, I report the performance of this logit model. My logit model correctly predicts outcomes in 57% to 99% of all cases.)

The predicted probability of each of the four adult psychiatric disorders is substituted in the analysis of LFP and earnings described in sections 4.4.1 and 4.4.2. The coefficient estimates of my IV analyses will be unbiased. Similarly, I repeat the estimation for four types of mental illness in cases of current mental illness. I substitute the lifetime mental illnesses variables with the cases when respondent currently (in the twelve months prior to the survey) suffers from mood, anxiety, alcohol, and drug dependence/abuse disorders (MOOD-12, ANXIETY-12, ALCOHOL-12, AND DRUG-12).

Hypotheses $H3_0$ and $H4_0$ from my theoretical model imply that the coefficient estimates for the individual's mental disorders will be negative: Individuals with poor mental health will allocate less time to the labor market and therefore have a lower probability of labor force participation and less income compared to healthy individuals. Alternatively, $H3_A$ and $H4_A$ imply that these coefficient estimates will be positive or zero.

4.5 Explanatory Variables

Below, I discuss the explanatory variables used in the empirical analyses. Definitions and descriptive statistics for the variables discussed below are presented in Tables 4.1 through 4.4. I begin with a discussion of the variables used in my analysis of DROPOUT.

4.5.1 Explanatory Variables in Analysis of DROPOUT

Parents' Mental Illness (P): In the development of my schooling model, I hypothesize that having a parent with a psychiatric disorder disrupts the home environment, leaving less time, effort, and financial resources for parents to invest in

TABLE 4.1
DESCRIPTIVE STATISTICS FOR HIGH SCHOOL DROPOUT
CONTROL VARIABLES

VARIABLE NAME	DEFINITION	FEMALES (N = 1757) MEAN	MALES (1632) MEAN
DEPENDENT VARIABLE:			
DROPOUT	=1 if has less than 12 years of schooling	0.082	0.104
		(0.27)	(0.32)
INDIVIDUALS CHARACTERISTICS (I)			
AGE	Age 19 –54 between 1936 -71	35.11	35.20
		(9.37)	(9.62)
AGE2	The squared of age	1323	1323
		(680)	(695)
GOODHEALTH	Good physical health	0.917	0.932
		(0.27)	(0.26)
BLACK	=1 if respondent is African American	0.110	0.083
		(0.31)	(0.29)
HISPANIC	=1 if respondent is Hispanic	0.066	0.081
		(0.24)	(0.19)
OTHERRACES	=1 if respondent is not African American nor Hispanic	0.034	0.035
		(0.18)	(0.52)
PROTESTANT	=1 if respondent is Protestant	0.562	0.523
		(0.49)	(0.52)
OTHERRELIGION	=1 if respondent is not Catholic nor Protestant nor no religion	0.061	0.068
		(0.24)	(0.26)
NORELIGION	=1 if respondent reports no religion	0.069	0.094
		(0.25)	(0.31)
ENGLISH	=1 if English was respondent's second language	0.122	0.155
		(0.32)	(0.38)
INTACTFAMILY	=1 respondent was raised by both natural parents	0.845	0.855
		(0.36)	(0.37)
YOUTH-DISORDER	=1 If respondent reports Mental illness before 18	0.334	0.351
		(0.46)	(0.50)
TEENCHILD	=1 If respondent had child before 18	0.129	0.053
		(0.33)	(0.24)

STANDARD DEVIATIONS IN PARENTHESES

(Continued on following page)

TABLE 4.1 (CONTINUED)

VARIABLE NAME	DEFINITION	FEMALES MEAN	MALES MEAN
FAMILY CHARACHTERISTICS (F)			
PARENT-EDUCATION	years of education of Major financial support education	11.34	11.21
		(3.60)	(3.94)
BETTERTHANAVG	=1 if family better than average financially	0.208	0.208
		(0.40)	(0.43)
WORSETHANAVG	=1 if family better than average financially	0.077	0.094
		(0.26)	(0.31)
SIBLINGS	number if siblings	3.375	3.091
		(2.65)	(2.45)
MOVED	number of times respondent changed Neighborhood during childhood 1.888	1.666	
		(3.24)	(3.07)
EXOGENOUS FACTORS (E):			
RURAL	=1 if respondent raised in Rural area	0.200	0.244
		(0.39)	(0.45)
NEAST	=1 if respondent from Northeast	0.223	0.215
		(0.41)	(0.43)
MIDWEST	=1 if respondent was from Midwest	0.277	0.246
		(0.44)	(0.45)
WEST	=1 if respondent was from West	0.177	0.185
		(0.38)	(0.41)
MAX-UNEMPLOYMENT	Max unemployment during 3 years of high school	17.09	17.6
		(2.76)	(3.32)
MIN-UNEMPLOYMENT	Min unemployment during 3 years of high school	14.86	14.68
		(2.39)	(2.76)
VIETNAM	=1 If respondent was in high school between 1965-74 0.298	0.298	0.303
		(0.45)	(0.48)

STANDARD DEVIATIONS IN PARENTHESES

TABLE 4.2.1
DESCRIPTIVE STATISTICS FOR HIGH SCHOOL DROPOUT
PARENTAL MENTAL DISORDERS INTERFERES WITH LIFE (I)

VARIABEL NAME	DEFINITION	FEMALES (N = 1757) MEAN	MALES (N = 1632) MEAN
I-DAD-DISORDER	=1 if father had mental illness interfere with life	0.291	0.266
		(0.45)	(0.46)
I-MOM-DISORDER	=1 if mother had mental illness interfere with life	0.216	0.148
		(0.41)	0.37)
I-DEPRESSION-DAD	=1if father had major depression interfere with life	0.114	0.091
		(0.31)	(0.30)
I-DEPRESSION-MOM	=1 if mother had major depression interfere with life	0.152	0.106
		(0.35)	(0.32)
I-ANXIETY-DAD	=1 if father had anxiety interfere with life	0.074	0.079
		(0.26)	(0.28)
I-ANXIETY-MOM	=1 if mother had anxiety interfere with life	0.099	0.071
		(0.29)	(0.27)
ALCOHOL-DAD	=1 if father had alcohol problem	0.221	0.204
		(0.41)	(0.42)
ALCOHOL-MOM	= 1if mother had problem with alcohol	0.077	0.047
		(0.26)	(0.22)
DRUG-DAD	= 1if father had drug problem	0.006	0.004
		(0.08)	(0.07)
DRUG-MOM	=1 if mother had drug problem	0.007	0.001
		(0.08)	(0.04)
COMORBIDITY			
I-DEPRES&ANXIETY-DAD			
	=1 if respondent's father had both Major depression and anxiety disorders	0.049	0.051
		(0.21)	(0.23)
I-DEPRES&ANXIETY-MOM			
	=1 if respondent's mother had both major depression and anxiety disorders	0.082	0.056
		(0.27)	(0.24)
I-DEPRES&ALCOHOL-DAD			
	=1 if respondent's father had both major depression and alcohol disorders	0.056	0.047
		(0.23)	(0.22)
I-DEPRES&ALCOHOL-MOM	=1 if respondent's mother had both major depression and alcohol	0.026	0.021
		(0.16)	(0.15)
I-ANXIETY&ALCOHOL-DAD	=1 if respondent's father had both anxiety and alcohol	0.035	0.037
		(0.18)	(0.20)
I-ANXIETY&ALCOHOL-MOM			
	=1 if respondent's mother had both anxiety and alcohol	0.023	0.010
		(0.15)	(0.11)
ALCOHO&LDRUG-DAD	=1 if respondent's father had Problem with both alcohol and drug	0.005	0.003
		(0.07)	(0.06)
ALCOHOL&DRUG-MOM	=1 if respondent's mother had Problem with both alcohol and drug	0.005	0.001
		(0.07)	(0.04)

STANDARD DEVIATIONS IN PARENTHESES

TABLE 4.2.2
DESCRIPTIVE STATISTICS FOR HIGH SCHOOL DROPUT
PARENTAL MENTAL DISORDERS IN CASE OF HOSPITALIZATION (H)

VAIABLE NAME	DEFINITION	FEMALES MEAN	MALES MEAN
H-DAD-DISORDER	=1 if father had any psychiatric disorder in case of hospitalization	0.240 (0.42)	0.224 (0.44)
H-MOM-DISORDER	=1 if mother had any psychiatric disorder in case of hospitalization	0.119 (0.32)	0.089 (0.30)
H-DEPRESSION-DAD	=1 if father had major depression in case of hospitalization	0.033 (0.18)	0.025 (0.16)
H-DEPRESSION-MOM	=1if mother had major depression in case of hospitalization	0.046 (0.21)	0.045 (0.22)
H-ANXIETY-DAD	=1if father had anxiety disorders in case of hospitalization	0.024 (0.15)	0.024 (0.16)
H-ANXIETY-MOM	=1if mother had anxiety disorder in case of hospitalization	0.031 (0.17)	0.033 (0.19)
ALCOHOL-DAD	=1 if father had any problem with alcohol	0.221 (0.41)	0.204 (0.42)
ALCOHOL-MOM	=1if mother had any problem with alcohol	0.077 (0.26)	0.047 (0.22)
DRUG-DAD	=1 if father had any problem with drug	0.006 (0.08)	0.004 (0.07)
DRUG-MOM	=1 if mother had any problem with drug	0.007 (0.08)	0.001 (0.04)
COMORBIDITY			
H-DEPRES&ANXIETY-DAD	=1if father had both major depression and anxiety	0.020 (0.14)	0.019 (0.44)
H-DEPRES&ANXIETY-MOM	=1 if mother had both major depression and anxiety	0.028 (0.16)	0.028 (0.17)
H-DEPRE&ALCOHOL-DAD	=1 if father had both major depression and problem with alcohol	0.016 (0.12)	0.008 (0.09)
H-DEPRES&ALCOHOL-MOM	=1 if mother had major depression and problem with alcohol	0.009 (0.09)	0.008 (0.10)
H-ANXIETY&ALCOHOL-DAD	=1 if father had anxiety and problem with alcohol	0.012 (0.11)	0.008 (0.09)
H-ANXIETY&ALCOHOL-MOM	=1 if mother had anxiety and problem with alcohol	0.008 (0.09)	0.005 (0.07)
ALCOHOL&DRUG-DAD	=1 if father had problem with alcohol and drug	0.005 (0.07)	0.003 (0.06)
ALCOHOL&DRUG-MOM	=1 if mother had problem with alcohol and drug	0.005 (0.07)	0.001 (0.04)

STANDARD DEVIATION IN PARENTHESES

TABLE 4.3
DESCRIPTIVE STATISTICS FOR HIGH SCHOOL DROPOUT
DIFFERENT TYPES OF YOUTH MENTAL DISORDERS

VARIABLE NAME	DEFINITION	FEMALES MEAN	MALES MEAN
YTH-DISORDER	=1 if respondent had youth Psychiatric disorder before 18	0.334 (0.47)	0.351 (0.50)
ANXIETY-YTH	=1 if respondent had anxiety disorder before 18 (Panic/ general anxiety/simple phobia/ Social phobia/ Agoraphobia/posttraumatic stress syndrome)	0.240 (0.42)	0.128 (0.35)
ANXIETY DISORDERS INTHIS STUDY INCLUDES:			
PANIC	=1if respondent had panic disorder before 18	0.011 (0.10)	0.004 (0.06)
GENRALANXIETY	=1if respondent had general anxiety before 18	0.013 (0.11)	0.006 (0.08)
SIMPLEPHOBIA	=1if respondent had simple phobia before 18	0.118 (0.32)	0.040 (0.20)
SOCIALPHOBIA	=1if respondent had social phobia before 18	0.116 (0.32)	0.070 (0.27)
AGORAPHOBIA	=1if respondent had agoraphobia before 18	0.035 (0.18)	0.024 (0.16)
POSTTRAUMATIC	=1if respondent had posttraumatic stress before 18	0.046 (0.21)	0.017 (0.14)
MOOD-YTH	=1if respondent had mood disorder before 18 (Depression/Dysthymia/Mania)	0.072 (0.26)	0.035 (0.19)
MOOD DISORDERS IN THIS STUDY INCLUDES:			
DEPRESSION	=1if respondent had depression before 18	0.063 (0.24)	0.028 (0.17)
DYSTHYMIA	=1 if respondent had dysthymia before 18	0.019 (0.13)	0.010 (0.11)
MANIA	=1if respondent had mania before 18	0.007 (0.08)	0.003 (0.06)
OTHER RELATED YOUTH PSYCHIATRIC DISORDERS INTHIS STUDY INCLUDES:			
ALCOHOL-YTH	=1if respondent had alcohol depend /abuse before 18	0.065 (0.24)	0.180 (0.40)
DRUG-YTH	=1if respondent had drug dependence/abuse before 18	0.042 (0.20)	0.080 (0.28)
CONDUCT	=1 if respondent had conduct disorder	0.050 (0.22)	0.152 (0.38)
COUNT-YTH	= OVERALL # OF YOUTH DISORDER	0.585 (0.29)	0.615 (0.37)

STANDARD DEVIATION IN PARENTHESES

(Continued on following page)

TABLE 4.3 (CONTINUED)

VARIABLE NAME	DEFINITION	FEMALES MEAN	MALES MEAN
COMORBIDITY			
ANXIETY&MOOD-YTH	=1 if respondent had anxiety and mood disorder	0.041	0.019
		(0.19)	(0.14)
ANXIETY&ALCOHOL-YTH			
	=1 if respondent had anxiety and alcohol	0.026	0.038
		(0.16)	(0.20)
ANXIETY-DRUG-YTH	=1 if respondent had anxiety and drug disorders	0.019	0.023
		(0.13)	(0.16)
ANXIETY&CONDUCT-YTH	=1 if respondent had anxiety and conduct disorders	0.022	0.040
		(0.14)	(0.21)
MOOD&ALCOHOL-YTH	=1 if respondent had mood and alcohol disorders	0.015	0.013
		(0.12)	(0.12)
MOOD&DRUG-YTH	=1 if respondent had mood and drug disorders	0.008	0.009
		(0.09)	(0.10)
MOOD&CDTYTH	=1 if respondent had mood and conduct disorders `	0.010	0.016
		(0.10)	(0.13)
ALCOHOL&DRUG-YTH	=1 if respondent had problem with alcohol and drug	0.026	0.063
		(0.10)	(0.26)
ALCOHOL&CONDUCT-YTH	=1 if respondent had alcohol and conduct disorders	0.010	0.063
		(0.09)	(0. 25)
DRUG&CONDUCT-YTH	=1 if respondent had drug and conduct disorders	0.008	0.037
		(0.29)	(0.20)

STANDARD DEVIATION IN PARENTHESES

TABLE 4.4
DESCRIPTIVE STATISTICS FOR LABOR MARKET OUTCOMES

VARIABLE NAME	DEFINITION	FEMALES MEAN	MALES MEAN
PSYCHIATRIC DISORDER VARIABLES:			
MOOD-LIFE	=1 If respondent had lifetime mood disorder	0.23	0.11
		(0.42)	(0.33)
ANXIETY-LIFE	=1 If respondent had lifetime anxiety disorder	0.31	0.18
		(0.46)	(0.41)
ALCOHOL-LIFE	=1 If respondent had lifetime alcohol dependence/abuse	0.15	0.30
		(0.36)	(0.49)
DRUG-LIFE	=1 If respondent had lifetime drug dependence/ abuse	0.08	0.12
		(0.27)	(0.35)
MOOD12	=1 If has respondent had mood disorder in last 12 months	0.10	0.05
		(0.30)	(0.24)
ANXIETY12	=1 If respondent had anxiety disorder in last 12 months	0.22	0.10
		(0.42)	(0.32)
ALCOHOL12	=1 If respondent had alcohol dependence/abuse in last 12 months	0.05	0.11
		(0.22)	(0.34)
DRUG12	=1 If respondent had problem with drug in last 12 months	0.01	0.03
		(0.12)	(0.19)
OTHER CONTROL VARIABLES:			
HOUSEHOLDSIZE	number of persons in household (any age)	3.23	3.23
		(1.39)	(1.69)
MARRIED	If respondent had steady marriage-like relationship	0.708	0.724
		(0.45)	(0.48)
DROPOUT	If respondent had less than 12 years of schooling	0.078	0.095
		(0.27)	(0.31)
SOMECOLG	If respondent had some college education	0.263	0.222
		(0.44)	(0.45)
COLLGE	If respondent had college degree	0.148	0.169
		(0.35)	(0.40)
COLGPLUS	If respondent had higher education than college	0.113	0.131
		(0.32)	(0.36)
SPOUSEINCOME	income of respondent's spouse	22,166	9,702
		(24,695)	(14,214)
ASSET	discrete variable for financial status[21]	427,299	490,974
		(1,052,377)	(1,212,274)
DEPENDENT VAIRABLES			
LFP	=1 If participate in labor force	0.84	0.96
		(0.37)	(0.22)
INCOME	Income (employed)	17,203	32,748
		(1,584)	(24,183)

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[21] Includes cash in all checking, savings accounts, stocks and bonds and real estate.

their children's schooling. Thus, I expect parental mental illness to be positively associated with the respondent's high school dropout probability. To test this hypothesis, I use information indicating whether each of the parents has a history of psychiatric disorders (major depression, anxiety disorder, alcohol abuse, and drug dependence and/or abuse).

I report the results of six alternative specifications using this information. First, I create separate dummy variables for the mother (I-MOM-DISORDER) and father (I-DAD-DISORDER) that have a value of one if the respondent reports that a parent has any of the above mental disorders to the degree that they "interfered with life." I also create dummy variables of (H-MOM-DISORDER) and (H-DAD-DISORDER) that have a value of one if the respondent reported that a parent has a mental illness to the degree that it required "hospitalization."[22]

Alternatively, I disaggregate both cases of the MOM-DISORDER variables and DAD-DISORDER into two sets of four dummy variables that have a value of one if the respondent reports that parent has a particular psychiatric disorder. The disorders are depression (I-DEPRESSION-MOM, I-DEPRESSION-DAD, H-DEPRESSION-MOM, H-DEPRESSION-DAD), anxiety disorders (I-ANXIETY-MOM, I-ANXIETY-DAD, H-ANXIETY-MOM, H-ANXIETY-DAD), alcohol dependence/abuse (ALCOHOL-MOM and ALCOHOL-DAD), and drug dependence/abuse (DRUG-MOM and DRUG-DAD).

[22] The respondent answered three questions concerning whether the mental disorder interfered with the parent's life, involved outpatient medical treatment of the parent, or led to hospitalization of the parent.

Individual's Mental Illness (O). Episodes of mental illness during schooling years are presumed to have a negative impact on schooling attainment, *ceteris paribus*. The individual's mental illness taxes his/her personal resources, leaving less time and effort for schooling. To control for mental illness during schooling years in my analysis of the effect of parental disorders on DROPOUT, I include a dummy variable (YOUTH DISORDER) that indicates if the respondent reported the onset of any mental illness before the age of 18.[23] In my analysis of school-age disorders on DROPOUT, I expand the specification of school-age disorders to five major adolescent disorders: mood, anxiety, alcohol, drugs dependence/abuse, and conduct disorders.

ANXIETY-YTH is a dummy variable with a value of one if the survey respondent had one or more of six major anxiety disorders (panic, general anxiety, simple phobia, social phobia, agoraphobia, and posttraumatic) before the age of 18. Similarly, MOOD-YTH is a dummy variable with a value of one if the survey respondent suffered from one or more of three major mood disorders (depression, dysthymia, and mania) before the age of 18.

ALCOHOL-YTH is a dummy variable with a value of one if the survey respondent had alcohol drug dependence/abuse before the age of 18. DRUG-YTH is a dummy variable with a value of one if the survey respondent had drug

[23] YOUTH DISORDER has a value of one if the respondent suffered from one or more of twelve possible types of psychiatric disorders (panic disorders, general anxiety disorders, simple phobias, social phobias, agoraphobia, posttraumatic stress disorder, depression, dysthymia, other affective psychoses, mania, alcohol dependence or abuse, drug dependence or abuse, conduct disorders).

dependence/abuse before the age of 18. Finally, CONDUCT is a dummy variable with a value of one if the survey respondent had conduct disorder during childhood. These are defined in Table 4.3.

Individual characteristics (C). A number of socioeconomic variables are included to control for gender, age, health status, race, religion, native language, and teenage marriage or parenting. These are defined in Table 4.1.

AGE is the person's age in years. It is a discrete variable with values between 19 and 54 (respondents born between 1936 and 1975). AGESQ is the square of AGE. Both age and the square of age are included to allow for the possibility of nonlinear effects of age on DROPOUT. Because the average years of schooling have increased over the last few decades in the United States, these variables will capture age cohort differences over time. Schooling attainment has increased over the last several decades, so that older people are less likely to have completed high school. I expect to find a positive association between age and DROPOUT.

GOODHEALTH is a dummy variable with a value of one if the respondent reports her or his health to be excellent, very good, good or fair and a value of zero if the respondent reports her or his health to be poor. I expect better health to be negatively associated with DROPOUT, *ceteris paribus*.

Several variables are included to control for differences in preferences due to cultural factors. Two dummy variables, BLACK and OTHER RACES, represent race. The reference group includes white respondents. Typically, studies have found lower high school completion rates among non-white groups. Another variable, HISPANIC, has a value of one if the respondent (BLACK or WHITE) indicated that he or she is

Hispanic. Similarly, religion is included to control for cultural tastes: Three dummy variables, PROTESTANT, OTHERRELIGION, and NORELIGION indicate a respondent's religion. The reference group includes Catholics.

ENGLISH is a dummy variable with a value of one if the respondent speaks a language other than English at home with a child. There is some evidence in the literature indicating that limited English proficiency is significantly associated with high school dropout rates.[24]

Family Characteristics (F). Several family characteristics are included as controls in the analysis. To control for the effects of family income during schooling years, I include two dummy variables indicating if the respondent reports that his or her family was financially better off (BETTER THAN AVG) or worse off (WORSE THAN AVG) than the average family.[25]

While family income represents the availability of financial support for a child's schooling, it does not capture the availability of the parents' time and effort for a child's schooling. To represent parental time and effort, I include two variables in our analysis. The first, INTACT FAMILY, is a dummy variable indicating whether the respondent lived with both natural parents until at least age fifteen. I assume that having both natural parents present will increase time and effort devoted to a child's schooling and therefore be negatively associated with DROPOUT. Manski et al. (1992) found that growing up with both parents present increases the probability that a child will graduate from high school.

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[24] The U.S. Department of Education (1990)

[25] Actual family income during schooling years is not available.

SIBLINGS presents the number of siblings in the respondent's childhood family. I assume that the greater the number of siblings, the less time and effort the parents have to invest in each on average, *ceteris paribus*.[26] Behrman and Taubman (1989) found that the number of siblings is negatively related to years of schooling completed.

Parents' educational attainment is often included in schooling studies to reflect the parents' taste for schooling or their efficiency in the production of the household component of schooling. Evidence in the literature supports these views. Many studies have found that parents' educational attainment is a highly significant factor influencing children's schooling attainment (Behrman and Taubman [1989]). In this analysis, I include a variable (PARENT-EDUCATION) representing the years of schooling of the child's primary source of financial support.[27] I predict that PARENT-EDUCATION will be negatively associated with DROPOUT.

Schooling is a production process that can be derailed if a child's course of studies is interrupted frequently. Lack of long-term stability is often measured in schooling studies by residential mobility. To control for residential mobility, I include in our analysis a discrete variable measuring the number of times the respondent's family moved during his or her schooling years. I predict that higher mobility will be positively associated with DROPOUT. Studies by Haveman and Wolfe (1994) and

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[26] The tradeoff between the quantity of children and the quality per child produced in the home is often referred to in the economics literature on fertility.

[27] In our sample, 78% of the respondents reported that the primary financial support came from the father,13% reported that the primary financial support came from the mother, 3% reported that it came from both, and 6% reported that it came from others.

Astone and Mclanahan (1994) find that residential mobility decreases schooling success.[28]

Finally, I include locational variables to control for the location in which the respondent grew up. RURAL is a dummy variable with a value of one if the respondent's childhood was spent mostly in a rural area rather than a city, suburb, medium-sized town, or small town. Particularly for older cohorts, I expect RURAL to be positively associated with DROPOUT. For older cohorts, a rural location implied that staying in school involved a high opportunity cost in terms of foregone farm labor. Alternatively, for younger cohorts, the availability of employment in urban areas may imply a higher high school dropout rate caused by migration to urban areas.

It is important to control for cultural and/or economic differences across regions that may be associated with differences in DROPOUT and are not explicitly controlled for by other variables in the analysis. Unfortunately, the NCS does not include the state or region of residence during the respondent's schooling years. An examination of the sample indicates, however, that 49% of respondents have lived in the same state for their whole life and 72% of respondents lived within 200 miles of the place where they were raised during most of their childhood. Thus, I use the region of residence at the time of the survey (WEST, NORTHEAST, MIDWEST, and SOUTH) as a proxy for the region of residence during the years of going to school.

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[28] Note, however, that Long (1992) reported that family dissolution is significantly associated with residential mobility, so that at least part of the mobility effect may be due to family dissolution. Astone and Mclanahan (1994) found that 30% of the difference in the probability of high school dropout between children from stepfamilies and children from intact families could be explained by the differences of their residential mobility.

Exogenous factors (E). Many empirical studies, for example Mincer (1991), have reported a decrease in the rate of return to education in the 1970s followed by an increase in the 1980s. Several factors depressed the rate of return between 1968 and 1973. The entry into the labor force of the post-World War II baby boom cohorts was an important demographic phenomenon. With relatively stable demand for labor, the increased supply of labor resulted in higher unemployment rates and in lower labor earnings. Higher unemployment rates and lower labor earnings may have significantly lowered the benefits of leaving high school and joining the full-time labor force. This is consistent with Hill's (1979) findings that higher demand for teenage labor increases the probability of dropping out of high school for both men and women.

To control for these effects on schooling, I include four variables. To capture variations in the unemployment rate over time, I include variables (MAX-UEMPLOYMENT and MIN-UEMPLOYMENT) representing the gender-specific maximum and minimum unemployment rate (for 16-19-year-old men or women) during the three-year period when the survey respondent was 16, 17 and 18 years old. I expect to find a negative effect of the maximum unemployment rate and a positive effect of the minimum unemployment rate on high school dropout.

During the years of the Vietnam War, young men seeking to avoid the military draft may have stayed in school longer than they would otherwise have done, *ceteris paribus*. To capture any specific effect of the draft, I include a dummy variable (VIETNAM) with a value of one if the survey respondent was in high school during the period of the Vietnam War military draft years (1964 to 1973). I expect a negative

association between DROPOUT and our dummy variable representing the military draft years.[29]

4.5.2 Explanatory Variables in Analysis of Labor Market Outcomes

Many of the explanatory variables in my analyses of labor force participation (LFP) and income (INCOME) are the same as those that I have used in the analyses of high school dropout. The coefficients of these variables are expected to have the same sign for labor force participation (LFP) and INCOME as they did in my analyses of high school DROPOUT. I have, however, several new explanatory variables in the analyses of labor market outcomes.

MOOD-LIFE has a value of one if the respondent suffered from one or more of four possible types of mood disorders--depression, bipolar, dysthymia, and mania--during the lifetime. ANXIETY-LIFE has a value of one if the respondent suffered from one or more of six possible types of anxiety disorders: agoraphobia, generalized anxiety, panic, simple phobia, social phobia, and posttraumatic stress during the lifetime. ALCOHOL-LIFE has a value of one if the respondent had lifetime alcohol dependence/abuse. DRUG-LIFE has a value of one if the respondent had lifetime drug dependence/abuse. Any episodes of lifetime mental illness are presumed to have a negative impact on labor force participation and annual income, *ceteris paribus*. The individual's mental illness taxes his/her personal resources, leaving less time and effort for labor force participation and thus less income level. Similarly,

[29] There were also exogenous shocks to the demand for labor, such as oil crises, that may have contributed to the lower rate of productivity growth in the 1970s.

MOOD-12, ANXIETY-12, ALCOHOL-12, DRUG-12 have a value of one if the respondent had mood, anxiety, alcohol, and drug dependence/abuse respectively during the last 12 months of the survey, *ceteris paribus*.

Individual characteristics (C). A number of socioeconomic variables are included to control for gender, age, health status, race, religion, native language, and teenage marriage or parenting. It is expected to have positive value for AGE and a negative value for AGESQ. Since female labor force participation and income have increased over the last several decades, these variables will capture age cohort differences over time for women. It is expected that older women have lower labor force participation and income than younger women. I expect better health (GOODHEALTH) to be positively associated with labor force participation rate (LFP) and annual income (INCOME), *ceteris paribus*.

I expect the effect of the following cultural variables on labor force participation and income to be similar to the effect on high school dropout (described in the previous section): BLACK, HISPANIC, and OTHER RACES. Similarly, three dummy variables, PROTESTANT, OTHERRELIGION, and NORELIGION control for cultural tastes. The reference group is again Catholic. The variable ENGLISH controls for the labor force participation rate and income effects of non-English speakers.

Family Characteristics (F). Two dummy variables, BETTER THAN AVG or WORSE THAN AVG, control for the financial condition of the respondent's family while he or she was growing up. The previous literature review suggests that people from higher-income families have a higher probability of labor force participation and

higher earnings than people from families with lower than average income. Similarly, I assume that growing up with both parents present (INTACT FAMILY) increases the probability of labor force participation and earnings. I expect several other variables to have similar effects on labor force participation rate and earnings as they did on the probability of high school completion. These variables are SIBLINGS, PARENT-EDUCATION, MOVED, RURAL, WEST, NORTHEAST, MIDWEST, SOUTH.

New control variables of labor market outcomes include MARRIED, DROPOUT, SOMECOLG, COLLEGE, COLGPLUS, ASSET, HOUSEHOLDSIZE, and SPOUSEINCOME. These are defined in Table 4.4. The variable MARRIED is a dummy variable with the value of one if respondent is married. The reference category includes all individuals who are currently single. DROPOUT, SOMECOLG, COLLEGE, and COLGPLUS represent the education of respondents. The reference category is high school graduation. It is expected that the individuals with higher education have a higher probability of participation in the labor force and higher earrings. Thus, we expect negative coefficients for DROPOUT and positive coefficients for SOMECOLG, COLLGE, and COLGPLUS. Finally, SPOUSEINCOME represents the income of a respondent's spouse. ASSET controls for a family's wealth. HOUSEHOLDSIZE controls for the number of persons in house.

4.6 Descriptive Statistics

Tables 4.1 through 4.7 present descriptive statistics of the male and female sub-samples. Table 4.1 reports the means and definitions of variables representing the individual's characteristic (C) and his/her own mental health (O) during schooling

TABLE 4.5.1
PERCENTAGE OF HIGH SCHOOL DROPOUTS
WITH RESPECT TO PARENTAL MENTAL DISORDERS INTERFERES WITH LIFE (I)

	PERCENTAGE DROPOUT FOR MENTAL ILLNESS VARIABLE= 1		PERCENTAGE DROPOUT FOR MENTAL ILLNESS VARIABLE =0	
VARIABLE:	WOMEN	MEN	WOMEN	MEN
I-DAD-DISORDERS	9.87 (0.10)	12.86(0.04)	7.49	9.47
I-MOM-DISORDERS	10.12 (0.12)	12.92(0.14)	7.64	9.93
I-DEPRESSION-DAD	6.95(0.50)	8.34 (0.37)	8.34	10.58
I-DEPRESSION-MOM	8.63(0.80)	13.95(0.08)	8.10	9.95
I-ANXIETY-DAD	12.0(0.10)	6.34 (0.10)	7.88	10.72
I-ANXIETY-MOM	9.61(0.50)	16.72 (0.02)	8.02	9.89
ALCOHOL-DAD	11.35(0.01)	14.68 (0.00)	7.28	9.27
ALCOHOL-MOM	12.70(0.05)	12.28 (0.60)	7.80	10.28
DRUG-DAD	13.06(0.60)	41.79 (0.00)	8.15	10.24
DRUG-MOM	14.60(0.40)	90.89 (0.00)	8.14	10.27
COMORBIDITY				
I-DEPRESSION&ANXIETY-DAD	11.7(0.22)	8.31(0.51)	8.00	10.48
I-DEPRESSION&ANXIETY-MOM	7.67(0.82)	17.75(0.01)	8.23	9.94
I-DEPRESSION&ALCOHOL-DAD	10.54(0.38)	8.25(0.501)	8.04	10.48
I-DEPRESSION&ALCOHOL-MOM	11.83(0.37)	17.02(0.18)	8.08	10.23
I-ANXIETY-ALCOHOL-DAD	16.95(16.95)	7.86(0.50)	7.86	10.47
I-ANXIETY&ALCOHOL-MOM	18.98(0.01)	30.44(0.00)	7.92	10.17
ALCOHOL&DRUG-DAD	7.65(0.96)	53.07(8.18)	8.18	10.25
ALCOHOL&DRUG-MOM	8.63(0.96)	90.89(0.00)	8.18	10.27

In parentheses is the probability of a χ^2 value exceeding the calculated value.

TABLE 4.5.2
PERCENTAGE OF HIGH SCHOOL DROPOUTS
WITH RESPECT TO PARENTAL MENTAL DISORDERS IN CASE OF HOSPITALIZATION (H)

	PERCENTAGE DROPOUT FOR MENTAL ILLNESS VARIABEL= 1		PERCENTAGE DROPOUT FOR MENTAL ILLNESS VARIABEL =0	
VARIABLE:	WOMEN	MEN	WOMEN	MEN
H-DADDISORDER	11.22 (0.01)	13.71 (0.01)	7.22	9.41
H-MOMDISORDER	14.11 (0.00)	11.76 (0.55)	7.38	10.24
H-DEPRES-DAD	11.73 (0.30)	4.70 (0.20)	8.06	10.52
H-DEPRES-MOM	13.15 (0.10)	12.91 (0.45)	7.94	10.25
H-ANXIETY-DAD	18.17 (0.02)	2.20 (0.07)	7.94	10.58
H-ANXIETY-MOM	12.57 (0.20)	23.10 (0.00)	8.04	9.94
ALCOHOL-DAD	11.35 (0.01)	14.68 (0.00)	7.28	9.27
ALCOHOL-MOM	12.70 (0.05)	12.28 (0.60)	7.80	10.28
DRUG-DAD	13.06 (0.60)	41.79 (0.60)	8.15	10.24
DRUG-MOM	14.60 (0.40)	90.89 (0.00)	8.14	10.27
H-MOOD&AXDAD	17.33(17.33)	2.72(0.05)	7.99	10.53
H-DEPRES&ANXIETY-MOM	7.76(7.76)	20.32(20.32)	8.19	10.09
H-DALDAD	19.93(19.93)	7.92(0.076)	7.99	10.39
H-MOOD&ALCOHOL-MOM	15.52(0.30)	37.42(0.00)	8.12	10.15
H-ANXIETY-ALCOHOL-DAD	27.55(0.00)	0.00 (0.020)	7.95	10.46
H-ANXIETY&ALCOHOL-MOM	15.31(15.31)	65.22 (0.00)	8.13	10.11
ALCOHOL&DRUG-DAD	7.65 (0.96)	53.07(53.1)	8.18	10.25
ALCOHOL&DRUG-MOM	8.63 (0.96)	90.89(0.00)	8.18	10.27

In parentheses is the probability of a χ^2 value exceeding the calculated value.

TABLE 4.6
PERCENTAGE OF HIGH SCHOOL DROPOUTS
WITH RESPECT TO DIFFERENT TYPES OF YOUTH MENTAL DISORDERS

	PERCENTAGE OF DROPOUT W/ YOUTH MENTAL ILLNESS VARIABLE = 1		PERCENTAGE OF DROPOUT W/O YOUTH MENTAL ILLNESS VARIABLE = 0	
VARIABLE:	WOMEN	MEN	WOMEN	MEN
TEENCHILD	28.73 (0.001)	34.17(0.001)	5.14	9.03
YOUTH DISORDER	12.40(0.00)	15.51(0.00)	6.06	7.60
ANXIETY-YTH	12.59(0.00)	18.08(0.00)	6.79	9.25
PANIC	0.00(0.20)	26.90(0.17)	8.27	10.31
GENERALAXIETY-YOUTH	24.17(0.01)	24.68(0.13)	7.97	10.29
SIMPYTH	15.22(0.00)	18.69(0.02)	7.24	10.03
SOCIALPHOBIA	12.15(0.03)	18.07(0.00)	7.66	9.80
AGORAPHOBIA	17.62(0.01)	16.79(0.16)	7.84	10.21
POSTTRAUMATIC	18.53(0.00)	25.65(0.00)	7.68	10.11
MOOD-YTH	11.24(0.20)	18.53(0.03)	7.94	10.08
DEPRESSION	7.21(0.70)	21.84 (0.01)	8.25	10.04
DYSTHYMIA	27.88(0.00)	18.55(0.03)	7.81	10.29
MANIA	10.84(0.74)	28.14(28.14)	8.16	10.31
ALCOHOL-YTH	14.22(0.01)	15.16(0.00)	7.76	9.32
DRUG-YTH	12.04(0.22)	15.43(0.04)	8.01	9.93
CONDUCT-YTH	20.39(0.00)	22.91(0.00)	7.53	8.13

In parentheses is the probability of a χ^2 value exceeding the calculated value.

TABLE 4.7
PERCENTAGE OF LABOR FORCE PARTICIPATION
WITH RESPECT TO LIFETIME AND CURRENT MENTAL DISORDERS

	PERCENTAGE LFP FOR MENTAL ILLNESS VARIABEL= 1		PERCENTAGE LFP FOR MENTAL ILLNESS VARIABEL =0	
VARIABLE:	WOMEN	MEN	WOMEN	MEN
MOOD-LIFE	79.4 (0.01)	93.2(0.10)	85.3	96.0
ANXIETY-LIFE	74.1 (0.00)	94.0(0.15)	88.4	96.1
ALCOHOL-LIFE	81.3 (0.25)	94.6(0.19)	84.4	96.2
DRUG-LIFE	71.5 (0.00)	96.4(0.70)	85.0	95.6
MOOD-12	73.2 (0.00)	92.9(0.23)	85.2	95.9
ANXIETY-12	73.3 (0.00)	94.2(0.36)	87.0	95.9
ALCOHOL-12	84.6 (0.90)	91.7(0.01)	83.9	96.2
DRUG-12	61.6 (0.01)	95.6 (0.97)	84.3	95.7

In parentheses is the probability of a χ^2 value exceeding the calculated value.

years. The mean values for most of the characteristics listed are similar for men and women. YOUTH DISORDER indicates that similar percentages for women (33%) and men (35%) in the study sample report having a psychiatric disorder during their schooling years. The differences between genders in the means of the family characteristic (F) and exogenous factor (E) described in Table 4.1 are also very small. Thirteen percent of women and 5% of men had a child before the age of 18.

Tables 4.2.1 and 4.2.2 report the descriptive statistics for a parent's major depression, generalized anxiety, alcohol and drug dependence/abuse and comorbidities of these disorders. In Table 4.2.1, we see that the fathers of 29% of the women and 27% of the men in our sample had a psychiatric disorder that interfered with life. While the mothers of 22% of the women in the sample had a psychiatric disorder, the mothers of only 15% of the men had a psychiatric disorder. [30] Table 4.2.1 also reports that the mother of females had higher comorbidity (8%) between depression and anxiety disorders, and fathers of males had higher comorbidity between depression and anxiety disorders (6%).[31]

Table 4.2.2 reports the parents' psychiatric and related disorders that led to hospitalization. The fathers of 24% of the women and 22% of the men in our sample had a psychiatric disorder that required hospitalization. While the mothers of 12% of the women in the sample had a psychiatric disorder, the mothers of only 9% of the

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[30] One way of explaining these differences is that women have over-reported their parental mental illness or men have under-reported. Kendler et al. (1997) stated that individuals who have disorders are more sensitive and report that disorder in their relatives compared to people who do not have this disorder.

[31] The separate identification of highly comorbid disorders categories such as drug use/abuse in some cases was not possible.

men had a psychiatric disorder. Among the comorbid disorders, mothers' mood and anxiety disorders were most frequent for both women and men.

Table 4.3 presents the descriptive statistics of youth psychiatric and related disorders.[32] The table reports that 33% of women and 35% of men had a psychiatric disorder before age 18. Among psychiatric disorders, while women had higher early onset of anxiety and mood disorders than men, men had higher early onset of conduct, alcohol and drug dependence/abuse than women. Table 4.3 also presents the means of different comorbidities of youth mental illness. The data indicate that comorbidity of anxiety and mood disorders is higher for women and comorbidity between alcohol and drug dependence/abuse is higher for men.

Table 4.4 presents the variables for the analysis of labor market outcomes. The means of the lifetime and current mental illness variables are reported in the top section of the table. The data suggest that a higher percentage of women in our sample suffer from lifetime mood (0.23) and anxiety disorders (0.31) compared to men (by 0.11 and 0.18, respectively). The data report, however, that a higher percentage of men suffer from lifetime alcohol (0.30) and drug dependence/abuse (0.12) than women (by 0.15 and 0.08, respectively). [33] The current mental disorders (the last twelve months) show similar patterns of prevalence of mental disorders among both men and women. While 10% of women currently (in the twelve months

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[32] Table 3 also has different subgroups of youth mental disorder. But, the small cell sizes leads to the high collinearity, which makes estimation of each disorder impossible.

[33] This is consistent with the study by Kessler (1994). He reports that most of the American men who have psychiatric disorders suffer from substance use disorders, and Antisocial personality disorder ASPD, while women suffer from affective disorders and anxiety disorder.

prior to the survey) suffer from mood disorders, and 22% suffer from anxiety disorders, only 5% of men currently suffer from mood disorders and 10% from anxiety disorders.

Table 4.4 also reports the means for the additional control variables used in labor market analysis. Seventy-one percent of women and 72% of men are currently in a marriage-like relationship. SPOUSEINCOME represents spouse income. Traditionally, men have higher labor force participation and thus higher income compared to women. This is consistent with our sample that women's spouse income ($22,166) is more than twice men's spouse income ($9,702). Although a smaller percentage of women did not complete high school (8% versus 10% for men), a larger percentage of them dropped out of college compared to men (15% versus 17%). ASSET also represents the total assets of the family including a checking account, savings, bonds, and real estate and all the other properties (in dollar terms). In this sample, men relatively have more assets as compared to women.

Finally, at the bottom of Table 4.4 are the means of the dependent variables. At the time of the survey, 84% of women and 96% of men were in the labor force. The mean annual income for women was $17,203 and for men was $32,748.

Tables 4.5.1 and 4.5.2 present the percentages of the women and men who have dropped out of high school in relation to parental mental disorders. The results are unadjusted for the other control explanatory variables.

The results suggest that a father’s history of mental illness (in aggregate form) has a statistically significant positive association with his children dropping out of

high school. This effect is quantitatively and qualitatively larger in the case of hospitalization compared with the case of interference with life. A mother's history of mental illness in case of hospitalization has a positive association with her daughter dropping out of high school.

Replacing the subgroups of parental mental disorders with the aggregate groups, we find, with a few exceptions, a strong positive association between parental mental disorders and the children's high school dropout probability. Particularly striking is the high value for men whose mothers have a comorbidity of alcohol and drug disorders, comorbidity of major depression and alcohol disorders, and comorbidity of anxiety and alcohol disorders. Surprisingly, there are some negative associations between the occurrence of a father's major depression, and a father's anxiety and his children's high school dropout probability rates.

Table 4.6 compares the percentage of high school dropout rates for individuals with different types of mental disorders during the schooling years with those who do not have these disorders. The results for these unadjusted descriptive statistics suggest that, except for one case (PANIC) for women, there is a high statistically positive association between all the different types of mental disorders during the schooling years and high school dropout rates for both men and women. Table 4.6 also reports that 28.7% of women and 34.2% of men who had a child before the age of 18 dropped out of high school compared to 5% and 9% for women and men, respectively, without a child at this age.

Table 4.7 compares the labor force participation rates of people with and without four major types of current and lifetime mental disorders. The results suggest

that all the mental disorders have a negative association with labor force participation rates. Both men and women with current and lifetime mood, anxiety, and drug disorders have a higher percentage of high school dropout compared to women without these disorders. Men with current alcohol disorders and lifetime mood disorders have a higher percentage of high school dropout compared to men without these disorders.

4.7 Summary

This chapter has described the empirical analysis that will be conducted in this study. For the first and second hypotheses, logistic analyses test the impact of parental mental disorders and school age disorders on high school dropout. For the first hypothesis I am expecting to find a positive impact of parental mental illness on their children's probability of high school dropout rate. Similarly, for the second hypothesis I expect to find a positive impact of adolescent psychiatric disorder during schooling years on the probability of high school dropout rate, *ceteris paribus*. The results of Hausman-Wu tests indicate that there is a significant endogeneity between girls' probability of high school dropout rate and mood, alcohol, and drug disorders. I did not find this endogeneity for boys' psychiatric disorders and their probability of high school dropout. Since Instrumental Variables are not available for the analyses of high school dropout, using simple logistic analysis may produce probable biases in the results presented.

For the third and fourth hypotheses, I expect to have negative impact of adult mental disorder on the probability of labor force participation rate and annual income.

The results of Hausman-Wu tests indicate that the endogeneity between four types of adult mental illness and adult labor market outcomes can not be rejected. In the analyses of labor market outcomes, parental mental disorders and individuals' mental disorders during schooling years will be used as identifying variables to predict the impact of adult mental disorders on the probability of labor force participation rate and annual income.

CHAPTER 5

EMPIRICAL RESULTS

This chapter presents the results of the empirical tests of the hypotheses. First, the estimated effects of parental mental illness and school age illness on high school dropout are reported. Next, the estimated impacts of mental disorders on labor force participation and personal income are described. A discussion of my empirical results is contained in Chapter 6.

5.1 The Logistic Analysis for the Impact of Parental Mental Disorders on the Probability of High School Dropout

The results for this section are obtained from logistic analysis of high school dropout in two cases: interference with daily life (I) and hospitalization (H). In this section, I investigate whether the results of my logistic analysis support my first hypothesis that parental psychiatric disorders have a negative impact on children's schooling attainment, *ceteris paribus*.

Tables 5.1.1 and 5.2.1 present the estimates of the marginal effects on the respondents' probability of high school dropout of parental mental illness that interfered with life. Similarly, Tables 5.1.2 and 5.2.2 present the marginal effects on the respondents' probability of high school dropout of parental mental illness that led

TABLE 5.1.1
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT CONTROLLING FOR PARENTAL MENTAL DISORDERS INTERFERES WITH LIFE
FOR FEMALES (N = 1757)*

SPECIFICATION	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
GOOD HEALTH	-0.04 [a]	-0.04 [a]	-0.04 [a]	-0.04 [a]	-0.04 [a]	-0.03 [a]
BLACK	-0.09[a]	-0.09[a]	-0.08[a]	-0.08[a]	-0.08[a]	-0.08[a]
PARENT-EDUCATION	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]
SIBLINGS	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]	0.00 [b]
MAX-UEMPLOYMENT	0.00	0.00	0.00	0.00	0.00	-0.00
MIN-UEMPLOYMENT	0.01	0.01	0.00	0.00	0.01	0.01
VIETNAM	-0.01	-0.01	-0.02	-0.01	-0.01	-0.02
I-DAD-DISORDER		0.00				
I-MOM-DISORDER		0.02 [c]				
I-DEPRESSION-DAD			-0.04 [b]	-0.09 [b]	-0.09 [b]	-0.08 [a]
I-DEPRESSION-MOM			0.01	0.03 [c]	0.03 [c]	0.01
I-ANXIETY-DAD			0.04 [b]	0.03	0.03	0.03
I-ANXIETY-MOM			-0.01	-0.01	-0.01	0.00
ALCOHOL-DAD			0.01	0.01	0.01	0.01
ALCOHOL-MOM			0.03 [b]	0.02	0.02	0.01
DRUG-DAD			0.02	0.13 [b]	0.12 [c]	0.11 [b]
DRUG-MOM			0.02	0.06	0.06	0.05
I-DEPRESSION&ANXIETY-DAD				0.06	0.06	0.03
I-DEPRESSION-ANXIETY-MOM				-0.03	-0.03	-0.02
I-DEPRESSION&ALCOHOL-DAD				0.05	0.05	0.05
I-DEPRESSION&ALCOHOL-MOM				-0.05	-0.05	-0.02
I-ANXIETY-ALCOHOL-DAD				-0.03	-0.03	-0.03
I-ANXIETY&ALCOHOL-MOM				0.07 [c]	0.07 [c]	0.05
ALCOHOL&DRUG-DAD				-0.17 [c]	-0.16 [c]	-0.14 [c]
ALCOHOL&DRUG-MOM				-0.07	-0.07	-0.07
YOUTH DISORDER					0.02 [b]	0.01
TEENCHILD						0.07 [a]
SPECIFICATIONS	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
-2 LOG L	789.7	786.2	777.0	764.2	758.8	688.4
Chi-square	178.1	181.5	190.8	203.6	208.9	279.3
DF	23	25	31	39	40	41

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 1 vs. 2	3.5	0.25
Specification 1 vs. 3	9.2	0.25
Specification 3 vs. 4	12.8	0.25
Specification 4 vs. 5	5.4	0.025
Specification 5 vs. 6	70.4	0.00

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*MARGINAL EFFECTS OF PARENTAL MENTAL DISORDERS (INTERFERES WITH LIFE)

TABLE 5.1.2
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT CONTROLLING FOR PARENTAL MENTAL DISORDERS IN CASE OF HOSPITALIZATION
FOR FEMALES (N =1757)*

SPECIFICATIONS	(1)	(2H)	(3H)	(4H)	(5H)
GOOD HEALTH	-0.04 [a]	-0.04 [a]	-0.03 [a]	-0.04 [a]	-0.03 [a]
BLACK	-0.08 [a]	-0.08 [a]	-0.09 [a]	-0.08 [a]	-0.08 [a]
PARENT-EDUCATION	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]
SIBLINGS	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]
MOVED	0.00	0.00	0.00	0.00	0.00
MAX-UEMPLOYMENT	0.00	0.00	0.00	-0.00	-0.00
MIN-UEMPLOYMENT	0.01	0.01	0.00	0.01	0.01
H-DADDISORDER		0.01			
H-MOMDISORDER		0.04 [a]			
H-DEPRESSION-DAD			-0.01	-0.15	-0.16
H-DEPRESSION-MOM			0.04 [c]	0.06 [a]	0.06 [a]
H-ANXIETY-DAD			0.07 [b]	0.06	0.05
H-ANXIETY-MOM			-0.02	0.12 [b]	0.11 [c]
ALCOHOL-DAD			0.00	0.00	0.00
ALCOHOL-MOM			0.03 [b]	0.03 [b]	0.03 [c]
DRUG-DAD			0.01	0.10	0.08
DRUG-MOM			0.01	0.02	0.02
H-DEPRESSION&ANXIETY-DAD				0.11	0.12
H-DEPRESSION&ANXIETY-MOM				-0.19 [a]	-0.18 [a]
H-DEPRESSION&ALCOHOL-DAD				0.11	0.11
H-DEPRESSION&ALCOHOL-MOM				-0.05	-0.07
H-ANXIETY&ALCOHOL-DAD				-0.05	-0.05
H-ANXIETY&ALCOHOL-MOM				0.09	0.10
ALCOHOL&DRUG				-0.13	-0.12
ALCOHOL&DRUG				-0.03	-0.03
YOUTH DISORDER					0.02 [a]

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)
-2 LOG L	789.7	778.1	773.6	760.6	754.4
Chi-square	178.1	189.6	194.2	207.2	213.4
DF	23	25	31	39	40

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 1 vs. 2	11.6	0.001
Specification 1 vs. 3	16.1	0.05
Specification 3 vs. 4	13	0.10
Specification 4 vs. 5	6.2	0.01

Marginal effects are partial derivative with respect to the vector of characteristics Computed at the means of the Xs

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*MARGINAL EFFECTS OF PARENTAL MENTAL DISORDERS (HOSPITALIZATION)

Due to the high multicollinearity, the convergence for this specification (including TEENCHILD) did not obtain.

TABLE 5.2.1
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT CONTROLLING FOR PARENTAL MENTAL DISORDERS INTERFERES WITH LIFE
FOR MALE S (N= 1632)*

SPECIFICATIONS	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
GOOD HEALTH	-0.05 [a]	-0.05 [a]	-0.06 [a]	-0.06 [a]	-0.05 [a]	-0.05 [a]
BLACK	0.00	0.00	0.00	0.00	0.02	0.01
PARENT-EDUCATION	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]
SIBLINGS	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]
MAX-UEMPLOYMENT	-0.01 [b]	-0.01 [b]	-0.01 [b]	-0.01 [b]	-0.01 [b]	-0.01 [c]
MIN-UEMPLOYMENT	0.01 [b]	0.01 [b]	0.01 [c]	0.01 [c]	0.01 [c]	0.01
I-DAD-DISORDER		0.01				
I-MOM-DISORDER		0.00				
I-DEPRESSION-DAD			-0.02	0.02	0.02	0.02
I-DEPRESSION-MOM			-0.01	-0.01	-0.02	-0.02
I-ANXIETY-DAD			-0.05 [c]	-0.08	-0.08	-0.08
I-ANXIETY-MOM			0.05 [b]	0.04	0.04	0.04
ALCOHOL-DAD			0.02	0.03 [b]	0.02	0.02
ALCOHOL-MOM			-0.00	-0.04	-0.04	-0.04
DRUG-DAD			0.10 [b]	0.04	0.05	0.05
DRUG-MOM			0.03	-0.01	-0.01	-0.02
I-DEPRESSION&ANXIETY-DAD				0.03	0.03	0.04
I-DEPRESSION&ANXIETY-MOM				-0.01	-0.00	-0.00
I-DEPRESSION&ALCOHOL-DAD				-0.09 [c]	-0.07	-0.07
I-DEPRESIONS&ALCOHOL-MOM				0.01	0.02	0.03
I-ANXIETY&ALCOHOL-DAD				0.02	0.01	0.02
I-ANXIETY&ALCOHOL-MOM				0.12	0.09	0.08
ALCOHOL&DRUG				0.08	0.06	0.05
YOUTH DISORDER					0.05 [a]	0.05 [a]
TEENCHILD						0.06 [a]

SPECIFICATION	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
-2 LOG L	931.6	930.8	914.7	905.0	883.7	868.1
Chi-square	260.0	260.8	276.9	286.6	307.9	323.5
DF	23	25	31	38	39	40

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 1 vs. 2	0.8	0.95
Specification 1 vs. 3	16.1	0.05
Specification 3 vs. 4	9.7	0.25
Specification 4 vs. 5	21.3	0.00
Specification 5 vs. 6	15.6	0.00

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

Note: ALCOHOL&DRUG-MOM in this model due to high collinearity with other variables has been dropped.

*MARGINAL EFFECTS OF PARENTAL MENTAL DISORDERS INCASE OF INTERFERE WITH LIFE

TABLE 5.2.2
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT CONTROLLING FOR PARENTAL MENTAL DISORDERS IN CASE OF HOSPITALIZATION
FOR MALES (N=1632)*

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)	(6H)
GOOD HEALTH	-0.05 [a]	-0.05 [a]	-0.06 [a]	-0.06 [a]	-0.05 [a]	-0.05 [a]
BLACK	0.00	0.00	0.00	0.01	0.02	0.01
PARENT-EDUCATION	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]	-0.01 [a]
BETTER THAN AVG	0.01	0.01	0.00	0.01	0.00	0.01
WORSE THAN AVG	-0.02	-0.02	-0.03 [c]	-0.02	-0.03 [c]	-0.03 [c]
SIBLINGS	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]	0.01 [a]
MAX-UEMPLOYMENT	-0.01 [b]	-0.01 [b]	-0.01 [c]	-0.01 [b]	-0.01 [b]	-0.01 [a]
MIN-UEMPLOYMENT	0.01	0.01 [b]	0.01	0.01 [a]	0.01 [a]	0.01 [a]
VIETNAM	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03 [c]
H-DADDISORDER		0.01				
H-MOMDISORDER		-0.00				
H-DEPRES-DAD			0.04	0.05	0.04	0.05
H-DEPRES-MOM			-0.08 [b]	-0.23 [c]	-0.20 [c]	-0.20 [c]
H-ANXIETY-DAD			-0.17 [a]	-0.18 [b]	-0.15 [b]	-0.15 [b]
H-ANXIETY-MOM			0.11 [a]	0.08 [c]	0.07	0.06
ALCOHOL-DAD			0.01	0.01	0.01	0.01
ALCOHOL-MOM			-0.00	-0.03	-0.03	-0.03
DRUG-DAD			0.09 [c]	0.04	0.05	0.05
DRUG-MOM			0.02	-0.05	-0.04	-0.04
H-DEPRESSION&ANXIETY-MOM				0.17	0.16	0.15
H-DEPRESSION-ALCOHOL-DAD				-0.01	-0.02	-0.04
H-DEPRESSIONALCOHOL-MOM				0.20 [a]	0.17 [a]	0.15 [a]
ALCOHOL-DRUG-DAD				0.07	0.05	0.04
YOUTH DISORDER					0.05 [a]	0.04 [a]
TEENCHILD						0.06 [a]

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)	(6H)
-2 LOG L	931.6	931.3	905.1	894.3	874.8	861.5
Chi-square	260.0	260.3	286.6	297.3	316.8	330.2
DF	23	25	31	35	36	37

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 1 vs. 2	0.3	0.95
Specification 1 vs. 3	26.2	0.001
Specification 3 vs. 4	10.8	0.05
Specification 4 vs. 5	19.5	0.00
Specification 5 vs. 6.	13.3	0.00

Marginal effects are partial derivative with respect to the vector of characteristics Computed at the means of the Xs

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

Due to the high multicollinearity estimation for H-ANXIETY-ALCOHOL-DAD, H-ANXIETY&ALCOHOL-MOM, and H-ALCOHOL-DRUG-MOM were not possible.

*MARGINAL EFFECTS OF PARENTAL MENTAL DISORDERS (HOSPITALIZATION)

to hospitalization. The marginal effect is the partial derivative with respect to a particular variable of the probability that the dependent variable is equal to one (computed at the means of the independent variables).[34]

Tables 5.1 and 5.2 present six alternative specifications for logistic regressions of the high school dropout rates for men and women. Comparing these six alternative specifications allows us to check the probability of dropping out of high school by adding parental mental illness and related variables to the traditional demographic variables. The first specifications (1) only include the individual characteristics (C), family characteristics (F), and exogenous (E) variables that traditionally have been used for finding the determinants of schooling attainment by researchers in this field.[35] This specification is a base case to which we compare five other specifications that include parental and related variables. The second specification (2I, 2H) adds the consolidated parental mental disorder variables to the model. The third specification replaces the consolidated variables representing parental psychiatric disorders with the variables representing specific disorders (3I, 3H). Specifications 4I and 4H incorporate the variables representing comorbid parental psychiatric disorders, and specifications 5I and 5H add the variable representing an individual psychiatric disorder during schooling years (before the age of 18) in the consolidated form to the

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[34] All tables in the body text present only marginal effects. The odds ratio and standard errors for each variable are presented in the appendix. The odds ratio presents the estimated coefficients of high school dropout in the exponential form. An odds ratio greater than one indicates a positive effect and a ratio less than one indicates a negative effect of that variable on the probability of dropping out of high school.

[35] Due to limited space I present only six out of twenty three control variables in all the tables in the text body. The complete descriptions of all control variables are presented in the appendix.

model. The last specifications (6I and 6H) add the variable indicating that the respondent became a parent before the age of 18.

The results of all six specifications for socio-demographic control variables in Table 5.1.1 indicate that reporting fair, good, or excellent health is associated with a lower probability of high school dropout probability for both men and women. Several of the cultural control variables are also significantly related to the probability of dropout. Among women, being Protestant rather than Catholic increases the probability of dropping out and reporting no religious affiliation also increases the probability of dropping out. [36] Being Black is associated with a lower probability of high school dropout for women and being Hispanic is associated with a higher high school dropout rate for women.

There is a negative association between the number of years of schooling of the individual's primary financial supporter and the probability of high school dropout for women. Similarly, a greater number of siblings increase the probability of high school dropout for women. Finally, women who lived in rural areas during their schooling years have a lower probability of dropping out of high school than those who lived in the suburbs or cities. All the other variables have the expected signs, but do not differ significantly from zero.

In Table 5.1.1, specification 2I adds two consolidated forms of parental mental illness to the first specification. The results indicate that women with mothers suffering from any type of mental illness have a 2 percent higher probability of

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[36] Appendix A5, Table A.4.3.

dropping out of high school, compared to women with mentally healthy mothers. The likelihood ratio test statistic, however, suggests that the addition of parental mental illness variables in consolidated form does not improve the performance of the model.

In specification 3I, I replace these two variables with variables representing the four subgroups of parental mental disorders. The null hypothesis suggests that the coefficients of parental mental illness variables are jointly zero (P-value < 0.25). Therefore, adding the entire set of parental mental illness variables to the model does not significantly increase the performance of the model. Several of these variables, however, are statistically significant. The results indicate that the coefficient for father's depression is unexpectedly negative. Investigating the data suggests that the collinearity between a father's depression and anxiety is 0.64. One reason for this opposite sign could be that a father's anxiety dominates the effects of a father's depression and makes its sign negative.

Women with a father suffering from anxiety have a 4% higher probability of dropping out of high school compared to women who have fathers without this disorder. Also, women who have mothers with alcohol problems have a 3% higher probability of dropping out compared to women who have mothers without this disorder. It is worth nothing that the collinearity between a mother's depression and anxiety (0.62) is the reason for the negative (but insignificant) sign for the impact of a mother's anxiety on the probability of dropping out of high school for girls.

By adding comorbidity of parental mental illness in specification 4I, we can check the impact of these variables on the probability of high school dropout for women. Women with mothers suffering from depression have a 3% percent higher

probability of dropping out of high school than women who have mothers without this disorder. Women with fathers with a drug problem have a 13% higher probability of dropping out of high school compared to women who do not have fathers with this disorder.

Women with mothers with comorbid anxiety and alcohol disorders have a 7% higher probability of dropping out of high school than women who do not have this disorder. The highly significant impact of a mother's anxiety and alcohol disorder (ANXIETY&ALCOHOL-MOM) on women's probability of dropping out of high school dominates the effects of a mother's problem with alcohol and makes it insignificant. The net effect on the probability of high school dropout for women whose fathers have comorbid drug and alcohol dependence/abuse is negative 4%. Thus, these women have a net 4% lower probability of dropout than other women. The likelihood ratio test comparing specification 4I to specification 3I suggests that the addition of comorbidity of parental mental illness does not significantly improve the performance of the model (P-value < 0.025).

Specification 5I adds the individual's mental illness during the schooling years to the model. Women with any type of mental illness during the schooling years have a 2% higher probability of dropping out of high school than women who do not have these disorders. The addition of the variable representing youth mental disorders decreases the magnitude of the impact of DRUG-DAD from 13% in specification 4I to 12% in specification 5I.

Finally specification (6I) adds the teen parenting (having a child while in school) variable to the model. Adding TEENCHILD (having a child before the age of

18) causes the variables representing mother's depression (DEPRESSION-MOM), mother's anxiety and alcohol disorders (IANXIETY&ALCOHOL-MOM) and youth mental illness to lose statistical significance. TEENCHILD has the effect of masking significant effects of parental and youth mental illness on the probability of dropping out of high school for women. A question of causality arises with respect to TEENCHILD. It is likely that DROPOUT and TEENCHILD are endogenous. This implies that the coefficient estimate of TEENCHILD may be biased.

Table 5.1.2 reports the comparisons of five alternative specifications for women controlling for parental mental illness that led to hospitalization. Again, the parental mental illnesses variables in consolidated form are added in specification 2H. Comparing specification 2H to specification 1, we see that the addition of these parental mental illness variables increases the log-likelihood by more than eleven points. The likelihood ratio test comparing these specifications leads me to reject the hypothesis that the coefficients of these two variables (parental mental illness in case of hospitalization) are jointly zero. Women with mothers suffering from any type of mental illness have a 4% higher probability of dropping out of high school than women with mentally healthy mothers.

This marginal effect on the probability of dropout is twice that reported in Table 5.1.1, by replacing the consolidated parental mental illness variables with the four specific variables representing subgroups of disorders. In specification 3H, the log-likelihood improves the likelihood function by sixteen points (P-value < 0.05). The marginal effects of parental mental illnesses are similar to those observed in Table

5.1.1 but the magnitudes are larger. Women with mothers suffering from depression in cases of hospitalization have a 4% higher probability of dropping out of high school than women with mothers without this disorder. Women with fathers suffering from general anxiety disorders have a 7% higher probability of high school dropout than women with fathers without this disorder. Women with mothers with alcohol dependency/abuse have a 3% higher probability of dropping out of high school than women with mothers without this disorder.

Specification 4H adds variables representing comorbid parental mental illnesses to specification 3H. When comparing specification 4H to specification 3H, we see that this addition increases the log-likelihood by thirteen points. The likelihood ratio test associated with this comparison leads me to reject the hypothesis that the coefficients of these variables (parental mental illness in the case of hospitalization) are jointly zero (P-value <0.1). Adding the comorbidity variables to the model increases the magnitude of the marginal effect of the mother's depression and anxiety on a woman's probability of dropping out of high school (compared to specification 3H). The net marginal effect on the probability of high school dropout for women whose mothers have comorbid depression and anxiety disorders is negative 1%. Thus, these women have a net 1% lower probability of dropout than other women.

In specification 5H, the addition of youth mental illness during the schooling years to the model decreases the marginal effects of parental mental illness on the probability of dropping out of high school. The likelihood ratio test associated with this comparison leads me to reject the hypothesis that the coefficient of youth mental

illness during the schooling years is zero (P-value <0.01). All of the other control variables have marginal effects on the probability of high school dropout that are quantitatively and qualitatively similar to the case in which parental mental illness interferes with life. In specification 6H convergence was precluded by high multi-collinearity.

Tables 5.2.1 and 5.2.2 present the results of the five alternative specifications for the logistic analysis of high school dropout for men. The marginal effects estimated for the demographic variables indicate that reporting fair, good or excellent health is associated with a lower probability of DROPOUT. OTHRACE is negatively associated with dropouts among men. As was the case for women, there is a negative association between the years of schooling of the individual's primary financial supporter and the probability of high school dropout. I also find that the larger the number of siblings, the higher is the probability of dropout. The greater the number of times men changed their residences during schooling years, the higher is the probability of dropout. Living in the Midwest and the West rather than the South decreases the high school dropout rate.

As expected, the higher the unemployment rate when the individual was of high school age, the lower was the probability of dropout among men. Before controlling for the unemployment rate, the effect of being between 15 and 18 years of age during the Vietnam War significantly decreases the probability of dropping out for men. This finding suggests that the incentive to stay in school longer to avoid the military draft had a significant impact. But when MIN-UEMPLOYMENT and MAX-UNEMPLOYMENT are added to the model, VIETNAM, becomes insignificant.

Surprisingly, adding the teen-parenting variable makes the VIETNAM variable significantly negative. All the other variables have the expected signs, but do not differ significantly from zero.

In Table 5.2.1 specification 2I adds the two consolidated forms of parental mental illness to the first specification for men. The likelihood ratio test statistic suggests that the addition of parental mental illness variables in consolidated form does not improve the explanatory power of the model. Not surprisingly, the magnitude effect of these variables on the probability of men dropping out of high school is statistically insignificant.

In specification 3I, I replace these two variables with the variables representing four subgroups of parental mental disorders. Surprisingly, the coefficient of fathers with anxiety is negative. This is contrary to my expectation and opposite to the sign for women. It may be that a father with anxiety is more controlling for sons than for daughters, or that the sons respond differently to the father's disorder from daughters. All the other variables have the expected sign. Men with fathers suffering from a drug problem have a 10% higher probability of high school dropout than men with fathers without this disorder. The likelihood ratio test of comparing specification 3I to 1 indicates that adding parental mental illness significantly improves the explanatory power of the model (at P-value < 0.05). It is worth noting that the effects of a mother’s depression and problems with alcohol are negative but insignificant. The collinearity between a mother’s depression and anxiety (62%) and between a mother’s problem with alcohol and anxiety (53%) could be the reason for these negative signs. By adding variables representing comorbid parental mental illnesses, specification 4I

allows a joint impact of these variables on the probability of high school dropout to be estimated. The likelihood ratio test statistics comparing specification 3I and 4I implies that this specification as a group does not significantly improve the log-likelihood (P-value = 0.25). This is not surprising because some marginal effects are estimated to be positive, while others are negative. The results suggest that men with fathers suffering from alcohol problems have a 3% higher probability of high school dropout than men who have fathers without this disorder. Contrary to my expectations, the marginal effect for fathers with comorbid depression and alcohol dependence/abuse is negative. The net marginal effect on the probability of high school dropout for men whose fathers have comorbid drug and alcohol dependence/abuse is -0.06. Thus, these men have a net 6% lower probability of dropout than other men.

Specification 5I adds the individual's mental illness during the schooling years to the model. The likelihood ratio test statistic comparing specifications 4I and 5I suggests that adding youth mental illness to the model significantly improves the performance of the model (at P-value < 0.001). Men with mental illnesses during their schooling years have a 5% higher probability of dropping out of high school than men who did not suffer from any mental illness during their schooling years. The strong impact of this variable on the high school dropout rate dominates the effects of the other parental mental illnesses and makes them all insignificant. Finally, I add TEENCHILD in the final specification. The marginal effect indicates that men who had a child before the age of 18 had a 6% higher probability of dropping out of high school than men who did not have a child before the age of 18.

Table 5.2.2 reports the marginal effects of parental mental disorder (hospitalization) in six alternative specifications. The marginal effects of all the demographic variables are similar to those in the case of parental mental illness interferes with life. Adding variables representing the consolidated form of parental mental illness in 2H does not increase the log-likelihood function significantly. The likelihood ratio test for this addition leads me to accept the hypothesis that the coefficients of these two variables (parental mental illness in case of hospitalization) are jointly zero (P-value < 0.95). Neither of the estimated marginal effects differs significantly from zero.

Substituting variables representing the subgroups of parental mental illness for the consolidated form in specification 3H, I find that the log-likelihood increases more than 26 points (P-value < 0.001). Men with mothers suffering from anxiety disorders have an 11% higher probability of high school dropout than men with fathers without this disorder. I also find negative marginal effects for two parental disorders. The effect of a father's anxiety on the probability of high school dropout is similar to that observed in Table 5.2.1. In addition, sons of mothers with depression have a lower probability of dropout than other men.

Adding the comorbid parental mental disorders increases the likelihood by almost 11 points (P-value < 0.05). The results of specification 4H indicate that the probability of dropping out of high school increases for men with mothers suffering from anxiety by 8%. The net marginal effect on the probability of high school dropout for men whose mothers have comorbid depression and alcohol dependence/abuse is

negative 3%. Thus, these women have a net 3% lower probability of dropout than other women.

The specification 5H appreciably improves the log-likelihood function about 20 points by adding youth mental illness to the explanatory variables of the model (P-value < 0.001). The marginal effect of youth mental illness increases the probability of high school dropout by 4%. The marginal effect of adding TEENCHILD in specification H6 is similar to that found in I6 in Table 5.2.1. Men who had a child before the age of 18 had a 6% higher probability of dropping out of high school than other men.

5.2. The Logistic Analysis for the Impact of Youth Mental Disorders on the Probability of High School Dropout

In this section, I use logistic analysis to investigate the impact of five types of school age mental disorders on the probability of high school dropout. Tables 5.3 and 5.4 present four alternative specifications of logistic regressions of high school dropout for men and women. Comparing these alternative specifications allows me to estimate the marginal effects of school age mental disorders on the probability of dropping out of high school.

The specifications defined in section 5.1 as 2I, 2H, 3I, and 3H are the base case to which I compare four new specifications that include variables representing five types of school-age mental disorders variables. The first specification (7I) adds five different types of school-age mental disorders to the specification 2I (from Table 5.1.1, which includes the consolidated variable representing parental mental disorder).

TABLE 5.3
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT CONTROLLING FOR DIFFERENT TYPES OF YOUTH MENTAL DISORDERS
FOR FEMALES (N = 1757)*

	(7I)	(7H)	(8I)	(8H)
MOOD-YTH	0.004	0.005	0.007	0.004
ANXIETY-YTH	0.015	0.016[b]	0.015[c]	0.015
ALCOHOL-YTH	0.035[b]	0.034[b]	0.033[b]	0.035[b]
DRUG-YTH	-0.012	-0.018	-0.012	-0.017
CONDUCT-YTH	0.037[b]	0.034[b]	0.037[b]	0.034[b]
DAD-DISORDERS	-0.002	0.004		
MOM-DISORDERS	0.014	0.036[a]		
DAD-DEPRESSION			-0.039[b]	-0.009
MOM-DEPRESSION			0.007	0.041[c]
DAD-ANXIETY			0.032[c]	0.060[b]
MOM-ANXIETY			-0.008	-0.019
DAD-ALCOHOL			0.005	0.001
MOM-ALCOHOL			0.031[b]	0.027[c]
DAD-DRUG			0.004	-0.001
MOM-DRUG			0.023	0.008

SPECIFICATION	(2I)[37]	(I7)	(H2)	(H7)	(I3)	(H3)	(I8)	(H8)
-2 LOG L	786.2	772.7	778.1	764.7	777	773.6	763.2	760.1
Chi-square	181.5	195	189.6	203	190.8	194.2	204.6	207.7
DF	25	30	25	30	31	31	36	36

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 7I Vs. 2I	8.1	0.1
Specification 7H Vs. 2H	8	0.1
Specification 8I vs. 3I	13.8	0.025
Specification 8H vs. 3H	13.5	0.025

*MARGINAL EFFECT OF DIFFERENT TYPES OF YOUTH MENTAL DISORDERS INCLUDING SPECIFICATION 2I IN 7I AND SPECIFICATION 2H IN 7H AND INCLUDING SPECIFIATION I3 IN H8 AND SPECIFICATION H3 IN H8

[37] Specification 1 from Table 6.1 and 6.H

TABLE 5.4
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT CONTROLLING FOR DIFFERENT TYPES OF YOUTH MENTAL DISORDERS
FOR MALES (N= 1632)*

	(7I)	(7H)	(8I)	(8H)
MOOD-YTH	0.000	0.000	-0.013	-0.006
ANXIETY-YTH	0.023[c]	0.023[c]	0.021	0.021
ALCOHOL-YTH	0.026[b]	0.026[b]	0.023[c]	0.024[c]
DRUG-YTH	0.008	0.008	0.009	0.002
CONDUCT-YTH	0.055[a]	0.055[a]	0.054[a]	0.052[a]
DAD-DISORDERS	0.002	-0.002		
MOM-DISORDERS	-0.005	-0.004		
DAD-DEPRES			-0.007	0.016
MOM-DEPRES			-0.022	-0.064[c]
DAD-ANXIETY			-0.057[b]	-0.133[b]
MOM-ANXIETY			0.047[b]	0.099[a]
DAD-ALCOHOL			0.009	0.005
MOM-ALCOHOL			-0.010	-0.008
DAD-DRUG			0.077	0.076
MOM-DRUG			-0.010	-0.018

SPECIFICATION	2I	7I	2H	7H	3I	8I	3H	8H
-2 LOG L	930.8	894.8	931.3	894.8	914.7	879.7	905.1	873.2
Chi-square	260.8	296.8	260.3	296.8	276.9	311.9	286.6	318.4
DF	25	30	25	30	30	36	31	36

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 7I Vs. 2I	36.0	0.000
Specification 7H Vs. 2H	36.5	0.000
Specification 8I vs.3 I	35	0.000
Specification 8H vs. 3H	31.9	0..000

*THE IMPACT OF DIFFERENT TYPES OF YOUTH MENTAL DISORDER

INCLUDING SPECIFICATION 2I IN 7I AND SPECIFICATION 2H IN 7H AND

INCLUDING SPECIFIATION 2I IN 8I AND SPECIFICATION 2H IN 8H

The second specification (7H) adds five different types of school-age mental disorders to specification 2H (from Table 5.1.2). The third specification (8I) adds five different types of school-age mental disorders to the specification 3I (from Table 5.1.1, which includes the variables representing the subgroups of parental psychiatric disorders). The last specification (8H) adds five different types of school-age mental disorders to the specification 3H (from Table 5.1.2).

Table 5.3 reports marginal effects of early onset of psychiatric disorders for a logistic regression of high school dropout. Parental psychiatric disorders are included as control variables in the analysis. The results suggest that the probability of high school dropout is 3.4 to 3.5 % higher for women with alcohol disorders, 3.4 to 3.7% higher for women with conduct disorder, and 1.5 to 1.6% higher for women with anxiety disorder compared to women without these disorders. The pattern of significant marginal effects of school age psychiatric disorders observed in 8I and 8H are similar to those on 7I and 7H.

The likelihood ratio tests comparing specifications 7I and 7H with specifications 2I and 2H indicate that adding the individual's mental illness during schooling years increased the performance of the model (P-value < 0.1). The likelihood ratio tests of comparing specifications 8I and 8H with specifications 3I and 3H indicate that adding the individual's mental illness during schooling years significantly increases the performance of the model (P-value < 0.025).

Table 5.2.4 reports the marginal effects in four alternative specifications on men's probability of high school dropout. The marginal probabilities indicate that the probability of high school dropout is 2.6% higher for men with alcohol disorders,

5.5% higher for men with conduct disorder, and 2.3% higher for men with anxiety disorder compared to men without these disorders. In specifications 8I and 8H, using disaggregated control variables for parental mental illness yields similar estimates except that the marginal probabilities of school age anxiety are not significant.

The likelihood ratio tests comparing specifications 7I and 7H with specifications 2I and 2H and 8I and 8H with specifications 3I and 3H indicate that adding the individual's mental illness during the schooling years has significantly improved performance of the model (P-value < 0.00).

5.3. Lifetime and Current Mental Disorders and Labor Force Participation and Income

In this section tables 5.5 through 5.16 present the marginal effects of individuals' adult mental illness on the probability of labor force participation and the level of earnings: First I report the results of a simple logistic analysis including variables representing mental illness as well as variables typically used in an analysis of labor force participation or earnings.

I use variables representing four types of lifetime and current mental illness. Because the results of the Hausman-Wu tests of endogeneity suggest that there may be significant endogeneity present, I use the predicted probabilities of four types of lifetime and current psychiatric disorders as instruments. These instrumental variables are predicted in a logit analysis including variables representing parental and school-age mental disorders.

Table 5.5 presents the estimates from a logistic analysis of the impact of four types of lifetime mental disorders on labor force participation for men and women. The results indicate that lifetime anxiety disorder and drug dependence/abuse decrease the probability of participating in the labor force by 7% for women. None of the lifetime mental disorders are significantly related to men's probability of labor force participation.

Table 5.6 presents the results of four alternative IV logistic specifications of the probability of labor force participation for women. The first two specifications (10I and 10H) use instrumental variables predicted using the consolidated form of parental mental disorders, consolidated form of individuals' youth mental disorders, and other control variables that may have an effect on lifetime mental disorders. The third and fourth specifications (11I and 11H) use instrumental variables predicted using four types of parental mental disorders and the consolidated form of youth mental disorders.

The results for specification 10I indicate that the probability of labor force participation rate is 24% lower for women with mood disorder than for women without this disorder. Specification 10H reports that the probability of labor force participation rate is 10% lower for women with anxiety disorder than for women without this disorder.

TABLE 5.5
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
CONTROLLING FOR LIFETIME MENTAL DISORDERS
FOR FEMALES (N = 1367) AND MALES (N= 1206)*

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(9)	(9)
MOOD-LIFE	-0.02	-0.01
ANXIETY-LIFE	-0.07[a]	-0.05
ALCOHOL-LIFE	0.04	-0.01
DRUG-LIFE	-0.07[b]	0.01
SPECIFICATIONS	FEMALES	MALES
# OF OBSERVATIONS	1367	1175
-2 LOG L	980.8	384.5
DF	30	30
chi-square	220.2	97.3

* indicates statistical significance at $\alpha \leq .10$; ** at $\alpha \leq .05$; *** at $\alpha \leq .01$

*MARGINAL EFFECT FOR THE IMPACT OF LIFETIME MENTAL DISORDERS ON LABOR FORCE PARTICIPATION

TABLE 5.6
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIAPTION
INSTRUMENTING LIFETIME MENTAL DISORDERS
FOR FEMALES (N =1367)*

VARIABLES	10I	10H	11I	11H
MOOD-LIF-HAT	-0.24[C]	-0.13	-0.09	-0.09
ANXIETY-LIF-HAT	-0.07	-0.07	-0.05	-0.10[c]
ALCOHOL-LIF-HAT	0.12	-0.02	-0.01	-0.13
DRUGLIF-HAT	0.01	0.07	0.05	0.06
SPECIFICATIONS	(10I)	(10H)	(11I)	(11H)
# OF OBSERVATIONS	1367	1367	1367	1367
-2 LOG L	983.5	987.1	986.6	990.3
DF	30	30	30	30
chi-square	217.5	213.9	214.4	210.7

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*INSTRUMENTING LIFETIME MENTAL ILLNESSES
BY USING PARENTAL MENTAL DISORDERS INTERFERENCE WITH DAILY LIFE AND HOSPITALIZATION AND YOUTH MENTAL DISORDERS AND OTHER CONTROL VARIABLES IN THE FIRST STAGE

Table 5.7 reports the results of four alternative IV logistic analyses of the impact of lifetime mental disorders on the probability of labor force participation for men. The results in Table 5.7 indicate that the probability of labor force participation is lower for men with anxiety by 8.6% compared to men without this disorder. Interestingly, the results for specification 11 indicate that the probability of labor force participation is 6.3% higher for men with a lifetime alcohol disorder than for men without this disorder.

TABLE 5.7
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
INSTRUMENTING LIFETIME MENTAL DISORDERS
FOR MALES (N=1206)*

VARIABLES	10I	10H	11 I	11H
MOOD-LIFE-HAT	-0.050	-0.062	-0.051	-0.041
ANXIETY-LIFE-HAT	-0.021	-0.054	-0.013	-0.086[c]
ALCOHOL-LIFE-HAT	0.002	0.038	0.003	0.063[c]
DRUG-LIFE-HAT	0.054	0.036	0.043	0.021
SPECIFICATIONS	(10I)	(10H)	(11I)	(11H)
# OF OBSERVATIONS	1206	1206	1367	1367
-2 LOG L	385.8	384.3	386.1	383.2
DF	30	30	30	30
chi-square	96.0	97.5	95.7	98.6

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*By using parental mental disorders interference with daily life and hospitalization and Youth mental disorders and other control variables

Table 5.8 reports Ordinary Least Squares (OLS) analysis of the impact of four types of lifetime mental disorders on the level of annual income for men and women. None of the types of lifetime mental disorders are statistically significant. Table 5.9 presents the results of four alternative specifications from a Tobit analysis of the

impact of four types of mental disorders on the level of women's annual income. The results indicate that the level of annual income is reduced for women with a mood disorder by $12,015, with an anxiety disorder by $12,363, and with drug dependence/abuse by $19,225 compared to women without these disorders.

TABLE 5.8
OLS ESTIMATION OF ANNUAL INCOME
CONTROLLING FOR LIFETIME MENTAL DISORDERS
FOR FEMALES (N=1367) AND MALES (N=1206)*

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(9)	(9)
MOOD-LIFE	-316.0	-225.9
ANXIETY-LIFE	-1,383.1	1,166.9
ALCOHOL-LIFE	1,779.4	738.0
DRUG-LIFE	-1,299.2	-683.5
VARIABLE	FEMALES	MALES
F VALUE	21.0[a]	20.9[a]
ADJ R-SQ	0.38	0.36
# of Observation	1417	1206
DF	30	30

Marginal effects are partial derivative with respect to the vector of characteristics computed at the means of the Xs

PARAMETER ESTIMATE FOR THE IMPACT OF LIFETIME MENTAL DISORDERS ON INCOME

TABLE 5.9
TOBIT ESTIMATION FOR ANNUAL INCOME
INSTRUMENTING LIFETIME MENTAL DISRODERS
FOR FEMALES (N=1367)*

VAIRABLE	(10I)	(10H)	(11I)	(11H)
MOOD-LIFE-HAT	-12,014.8[c]	-8,477.0	39,456	3,740.8
ANXIETY-LIFE-HAT	-12,362.5[a] -	10,352.6[a]	-11,551[a]	-10,677[a]
ALCOHOL-LIFE-HAT	40,030.5[a]	31,340.2[a]	20,781[a]	16,429.3[b]
DRUG-LIFE-HAT	-19,224.9[b]	-18,185.2[b]	-14,833[b]	-9,772.6
	(10I)	(10H)	(11I)	(11H)
NonCensord Values	961	961	961	961
DF	30	30	30	30
Log Likelihood	-11457	-11459	-13748	-11462

The numbers in tables present the parameter estimated for instrumental variables of restricted income.

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*BY USING PARENTAL MENTAL DISORDERS INTERFERENCE WITH DAILY LIFE AND HOSPITALIZATION AND YOUTH MENTAL DISORDERS AND OTHER CONTROL VARIABLES

Surprisingly, the level of annual income is higher for women with lifetime alcohol dependence/abuse compared to women without this disorder. Table 5.10 repeats the Tobit estimation for the impact of four types of lifetime mental disorders on the men's level of annual income. Surprisingly, the result suggests that men with drug dependence/abuse have a higher annual income than men without this disorder.

TABLE 5.10
TOBIT ESTIMATION FOR ANNUAL INCOME
INSTRUMENTING LIFETIME MENTAL DISRODERS
FOR MALES (N=1206)*

VAIRABLE	(10)	(10)	(11)	(11)
MOOD-LIFE-HAT	7,477	3,059.1	896.0	4,049.7
ANXIETY-LIFE-HAT	1,67.3	-2,384.7	6,385.3	-7,609.8
ALCOHOL-LIFE-HAT	-10,150	-6,625.9	-8,826.8	62.84
DRUG-LIFE-HAT	16,692[b]	15,774.3[b]	10,688.8	10,382.2
	(10I)	(10H)	(11I)	(11H)
NonCensord Values	1045	1045	1045	1045
DF	30	30	30	30
Log Likelihood	-13745.6	-13747.4	-13747.1	-13748

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*BY USING PARENTAL MENTAL DISORDERS INTERFERENCE WITH DAILY LIFE AND HOSPITALIZATION AND YOUTH MENTAL DISORDERS AND OTHER CONTROL VARIABLES

Comparing simple logistic analysis with IV logistic analysis and OLS regression with IV Tobit regression allows us to check for the presence of endogeneity between the probability of labor force participation rate and the level of annual income and four types of lifetime mental disorders. The results of these comparisons indicate that using an IV model makes the impact of mood disorder for women's probability of labor force participation rate and anxiety disorder for men's probability of labor force

participation rate significant. Similarly, comparing the results of simple OLS regression with IV Tobit regression of the level of annual income indicates that using an IV model makes the impact of mood, anxiety, and alcohol disorders on women's annual income significant.

It is possible that current mental disorder has a greater impact on labor market performance than lifetime mental disorders. Tables 5.11-5.16 report the results for simple and IV models of the impact of current mental disorders on labor force participation and annual income for men and women.

The results in Table 5.11, from the logistic analysis, indicate that women with a current anxiety disorder have a 5.8% lower probability of labor force participation than women without this disorder. Interestingly, women with current alcohol dependence/abuse have a 9.4% higher probability of participating in the labor force than women without this disorder.

TABLE 5.11
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
CONTROLLING FOR CURRENT MENTAL DISORDERS
FOR FEMALES (N = 1367) AND MALES (N=1206)*

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(12)	(12)
MOOD-12	-0.037	-0.001
ANXIETY-12	-0.058[a]	0.001
ALCOHOL-12	0.094[b]	-0.020[a]
DRUG-12	-0.100	0.015
SPECIFICATIONS	FEMALES	MALES
# OF OBSERVATIONS	1367	1175
-2 LOG L	986.7	382.3
DF	30	30
chi-square	214.3	99.6

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*MARGINAL EFFECTS OF CURRENT MENTAL DISORDERS ON LABOR FORCE PARTICIPATION

Table 5.12 presents results from the IV logistic analysis of women's probability of participating in the labor force. The results indicate that women with current anxiety disorder have a 14.2% lower probability of participating in the labor force than women without this disorder. Although the results of the simple logistic analysis for men presented in Table 5.11 indicate that men with alcohol dependence/abuse are less likely to be in the labor force, the results of the IV logistic analysis in Table 5.13 do not show a significant impact of any of the four types of current mental disorders on men's probability of participating in the labor force.

Table 5.14 presents the OLS regression results of the impact of current mental disorders on level of annual income for men and women. The results suggest that women with current anxiety disorder have about $2,588 less annual income than women without this disorder. Tables 5.15 and 5.16 present the IV Tobit regression results of the impact of current mental disorders on the level of annual income for women and men. The results suggest that women with current anxiety disorder have a lower annual income ($10,488) than women without this disorder. Surprisingly, the results suggest that women with alcohol dependence/abuse have a higher level of annual income ($24,927) and men with drug dependence/abuse have a higher level of annual income ($38,780) than men and women without these disorders.

TABLE 5.12
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
INSTRUMENTING CURRENT MENTAL DISORDERS
FOR FEMALES (N=1367)*

VARIABLES	13I	13H	14I	14H
MOOD-12-HAT	-0.209	-0.205	-0.153	0.016
ANXIETY-12-HAT	-0.070	-0.050	-0.071	-0.142[b]
ALCOHOL-12-HAT	-0.008	-0.168	-0.036	-0.009
DRUG-12-HAT	-0.017	0.223	-0.079	-0.001
SPECIFICATIONS	(12I)	(12H)	(13I)	(13H)
# OF OBSERVATIONS	1367	1367	1367	1367
-2 LOG L	984	985.8	983.8	992
DF	30	30	30	30
chi-square	216.9	215.2	217.2	208.8

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*By using parental mental disorders interference with daily life and hospitalization and youth mental disorders and other control variables.

TABLE 5.13
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
INSTRUMENTING CURRENT MENTAL DISORDERS
FOR MALES (N=1206)*

VARIABLES	13I	13H	14 I	14H
MOOD-12-HAT	-0.082	-0.097	-0.070	-0.056
ANXIETY-12-HAT	0.029	0.058	0.026	0.038
ALCOHOL-12-HAT	-0.004	-0.045	-0.005	-0.032
DRUG-12-HAT	0.023	0.079	0.015	0.040
SPECIFICATIONS				
# OF OBSERVATIONS	1206	1206	1367	1367
-2 LOG L	387.4	384.3	387.6	387.4
DF	30	30	30	30
chi-square	94.4	97.5	94.2	94.4

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*By using parental mental disorders interference with daily life and hospitalization and Youth mental disorders and other control variables

TABLE 5.14
OLS ESTIMATION OF ANNUAL INCOME
CONTROLLING FOR CURRENT MENTAL DISORDERS
FOR FEMALES (N=1367) AND MALES (N=1206)*

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(12)	(12)
MOOD-12	-815.48	721.88
ANXIETY-12	-2588.4[b]	2041.64
ALCOHOL-12	2646.6	742.93
DRUG-12	-1683.6	-2363.7
F VALUE	21.0[a]	20.9[a]
ADJ R-SQ	0.39	0.36
# of Observation	1417	1206
DF	30	30

Estimated parameters for OLS estimation of restricted income.

Marginal effects are partial derivative with respect to the vector of characteristics computed at the means of the Xs

* indicates statistical significance at $\alpha \leq .10$; ** at $\alpha \leq .05$; *** at $\alpha \leq .01$

TABLE 5.15
TOBIT ESTIMATION FOR ANNUAL INCOME
INSTRUMENTING CURRENT MENTAL DISORDERS
FOR FEMALES (N=1367)*

VAIRABLE	(13I)	(13H)	(14I)	(14H)
MOOD-12-HAT	-8,289.8	-12,443.2	-68,00.5	-6,549.0
ANXIETY-12-HAT	-10,487.5[a]	-7,548.7[c]	-9,156.9[a]	-9,795.6[a]
ALCOHOL-12-HAT	24,888.9[a]	20,227.4[b]	2,0691.2[b]	24,927.2[a]
DRUG-12-HAT	-7095.4	-11,456.5	-9,704.8	-15,366.1
NonCensord Values	961	961	961	961
DF	30	30	30	30
Log Likelihood	-11461.6	-11463	-11462	-11462.2

The numbers in table, present the estimated parameters of Tobit for restricted income.

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*By using parental mental disorders interference with daily life and hospitalization and Youth mental disorders and other control

TABLE 5.16
TOBIT ESTIMATION FOR ANNAUL INCOME
INSTRUMENTING CURRENT MENTAL DISORDERS
FOR MALES (N=1206)*

VAIRABLE	(13I)	(13H)	(14I)	(14H)
MOOD-12-HAT	1,3949.9	-5,274.3	7,226.8	9,333.0
ANXIETY-12-HAT	-2,305.1	11,106.4	8,149.8	6,567.9
ALCOHOL-12-HAT	-2,222.8	-13,738.6	-7,447.9	-11,152.6
DRUG-12-HAT	21,149.9	38,780.1[b]	11,688.5	21,583.7
	(13I)	(13H)	(14I)	(14H)
NonCensord Values	1045	1045	1045	1045
DF	30	30	30	30
Log Likelihood	-13746.3	-13746	-1374701	-13747

The numbers in table, present the estimated parameters of Tobit for restricted income.

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

*By using parental mental disorders interference with daily life and hospitalization and youth mental disorders and other control variables

CHAPTER 6

CONCLUSION

This study provides a number of new results regarding the contribution of family mental health background to the individual's schooling, labor supply, and earnings. This is the first study in economics to include parental and the individual's mental disorders as a determinant of high school dropout. Although I can compare my findings on the contribution to schooling of parental and individual mental illness with those of the psychological literature, to date there is no other study in the economics literature using a nationally representative survey with which I can compare my results.

Like previous studies that I have reviewed, I find that using different specifications produces different results. I also find, however, that comparing different specifications is useful in obtaining the best performing model. This is important for performing policy simulations. Nevertheless, researchers investigating this topic need to be particularly sensitive to the choice of specification.

6.1 Discussion of the Results

From a choice-theoretical framework, I developed the following hypotheses:

Hypothesis # 1. Children whose parents have a psychiatric disorder will have lower schooling attainment than children with parents without disorders, *ceteris paribus*.

Hypothesis # 2. Individuals who have a psychiatric disorder during schooling years will have lower schooling attainment than those without disorders, *ceteris paribus*.

Hypothesis # 3. Adults who have a psychiatric disorder have a lower probability of labor force participation than individuals without these disorders, *ceteris paribus*.

Hypothesis # 4. Adults who have a psychiatric disorder will have lower labor earnings than individuals without these disorders, *ceteris paribus*.

To test these hypotheses, I used a sample of 1632 men and 1757 women between the ages of 19 and 54 drawn from respondents to the National Comorbidity Survey. For each hypothesis, I began with demographic characteristic variables that traditionally have been used in studies of schooling attainment or labor market outcomes. My findings are consistent with the results found in prior studies, suggesting that this was an appropriate sample for investigating the impact of mental illness on high school dropout and labor market outcomes.

The first objective of my research was to examine the impact of parental mental illness on the probability of high school dropout. The results of my research suggest that the addition of variables representing the subgroups of parental mental illness significantly improve the performance of the estimating model. My results

confirm those of Jayakody et al. (1998), who found that parental mental illness does not have a significant effect on the probability of high school dropout rate for boys (in case of using parental mental disorders in the consolidated form). My findings for girls, however, indicate that girls who have mothers with a mental disorder have a higher probability of dropping out of high school. Moreover, the results of adding variables representing four types of parental mental disorders to the model indicate that several parental disorders as well as comorbid disorders substantially increase the probability of high school dropout for both boys and girls. The magnitude of the negative impact of parental mental illness on the probability of high school dropout rate is generally larger when the severity of parental mental illness is more severe (hospitalization). Surprisingly, I find one parental disorder that is consistently estimated as decreasing the probability of high school dropout. I find that fathers' anxiety as decreasing the probability of high school dropout lowers the probability of high school dropout for boys.

The results of this study suggest that the probability of high school dropout is higher for women with fathers suffering from drug problems, with mothers suffering from anxiety disorder, with mothers suffering from depression, with fathers suffering from anxiety disorder, with mothers suffering from alcohol problems, and with mothers suffering from comorbid alcohol and anxiety disorders than for girls with parents without these disorders. Thus, my hypothesis is generally supported by my findings for women.

The probability of high school dropout is higher for men with fathers suffering from drug dependence/abuse, with mothers suffering from generalized anxiety

disorder, and with mothers suffering from comorbidity of depression and alcohol disorders than for men with parents without these disorders. Thus, the results of this study support the first hypothesis for boys for most types of parental mental disorders. The negative marginal effect of a father's anxiety disorder on a man's probability of dropping out of high school, however, is unexpected. An untested explanation for this case is that men with anxiety better monitor their sons and that leads to higher schooling attainment of their sons.

Kessler (1996) reports that the early onset of psychiatric disorder leads to teenage pregnancy that subsequently leads to high school dropout for women. My results indicate that boys and especially girls who had a child before the age of 18 had a higher probability of high school dropout than boys and girls who did not. Therefore, the early onset of psychiatric disorder directly and indirectly (through teenage parenting) results in a higher probability of high school dropout, especially for women. When I added the teen-parenting variable to the model, the strong impact of teen parenting dominates the effects of both parental disorders (mother's depression and mother's comorbid anxiety and alcohol disorders) and the individual's own school-age disorders, leaving them statistically insignificant. This can be attributed to the high correlation between parental mental illness, individual mental illness before the age of 18 and having a child before the age of 18. A closer investigation indicates that the probability of having a child before the age of 18 is higher for women with mothers suffering from comorbid anxiety and alcohol disorders and for women with mothers suffering from depression as well as women with school-age psychiatric disorders than for women without these effects.

These findings are consistent with previous studies indicating that the most important factor influencing high school dropout for girls is teenage pregnancy. There is, however, likely to be endogeneity between teenage pregnancy and high school dropout. Thus, to investigate reliably the connection between teenage pregnancy, psychiatric disorders, and high school dropout, a comprehensive analysis is needed which will carefully handle potential endogeneity.

The second objective of this study was to investigate the impact of early onset of psychiatric disorder on the probability of high school dropout. The results of the logistic analysis indicate that anxiety, alcohol, and conduct disorders significantly increase the probability of high school dropout for both men and women. This is consistent with my second hypothesis.

However, the results of the Hausman-Wu tests indicate that there is significant endogeneity between the probability of high school dropout and mood, alcohol, and drug disorders (at value < 0.05) for women. The results, however, do not show significant endogeneity between the probability of high school dropout and mental disorders for men.

I am unable to estimate an IV model of high school dropout. Instead, I estimate a single logistic analysis of the impact of own mental illness on the probability of high school dropout. Because individuals' psychiatric disorders are endogenous with school performance, the estimate of the effect of the school-age psychiatric disorders on the probability of high school dropout for women may be biased.

The third objective of this study is to investigate the impact of mental illness on labor force participation and the level of annual income. The logistic and Ordinary Least Square (OLS) models are used as benchmarks, which are compared with the results of instrumental variables (IV) analyses that control for the potentially endogenous mental disorder variables.

The results of the Hausman-Wu tests indicate that there is significant endogeneity between the probability of labor force participation rate and all four major types of adult mental disorders for both men and women. Kessler (1982) argues that, while among women education is the strongest predictor of psychiatric symptoms (depression and anxiety), employment is the significant predictor for psychiatric symptoms for men. While the results of Hausman-Wu tests for schooling confirm the study by Kessler that education is a strong predictor of psychiatric symptoms (depression and anxiety) for women only, the results of my estimation of labor market outcomes models implies that employment is a significant predictor of psychiatric symptoms for both men and women.

I use an IV logistic model to estimate probability of labor force participation and an IV Tobit model to estimate the impact of four types of lifetime and current mental disorders on annual income. The results of IV logistic analysis for the impact of lifetime mental disorders indicate that the probability of labor force participation is lower for women with a lifetime mood disorder and with a lifetime anxiety disorder than for women without these disorders. Surprisingly, having a lifetime alcohol dependence/abuse increases men's probability of labor force participation compared to men who have not had this disorder.

The results of IV analysis for the impact of lifetime mental disorders suggest that the level of annual income is lower for women with lifetime mood, anxiety, and drug disorders than for women without these disorders. Surprisingly, the results of Tobit regression suggest that the level of annual income is higher for women with lifetime alcohol dependence/abuse and men with drug dependence/abuse than for women and men without these disorders.

The results of the IV logistic analysis of the impact of current mental disorders on the probability of labor force participation suggest that the probability of labor force participation is lower for women with current anxiety disorder than for women without this disorder. The results of the IV Tobit analysis of the impact of current mental disorders suggest that the level of annual income is lower for women with a current anxiety disorder than for women without this disorder. Using IV logistic and Tobit analyses causes the negative impacts of lifetime and current mood and anxiety disorders on the probability of labor force participation rate and level of annual income to more significant for both men and women (compared to simple logit and Tobit analysis).

The third set of findings suggests that the negative impact of mental illness on labor market outcomes is larger for women than for men. This may have two familiar explanations in labor market discrimination against women. First, this may be due to the fact that a woman with a lower wage rate may be a secondary earner in the household. As such, she may choose to drop out of the labor force at the onset of a psychiatric disorder. Second, the limited range of occupations open to women makes it more difficult for a women to self-select into a job that minimizes the adverse

effects of a disorder or is more accommodating to her health status, so she may select a job with lower income.

The results of this study support my third hypothesis: the probability of labor force participation is lower for women with lifetime mood and anxiety disorders and for men with anxiety disorders. The results do not support hypothesis # 3 for the impact of lifetime alcohol and drug dependence/abuse on the probability of labor force participation for men and women.

The results of the impact of current mental disorders suggest that the probability of labor force participation rate is lower for women with a current anxiety disorder. The results do not support my hypothesis # 3 for any mental disorder for men. The results for women also support my hypothesis # 4: Anxiety disorders have a negative impact on annual income for women. My hypothesis # 4 is, however, not supported by the results for men.

Contrary to hypotheses # 3 and # 4, I find the positive effects of psychiatric disorders in three instances: Women who suffer from alcohol dependence/abuse disorders have a higher annual income than their healthy peers. Men with alcohol dependence/abuse have a higher probability of labor force participation than men without this disorder. Men with drug dependence/abuse have a higher level of annual income compared to men without this disorder.

6.2 Implications for Theory and Research

This study extends the previous literature on the determinant of high school dropout by investigating the impact of four major types of parental and five types of

youth mental disorders on children's probability of high school dropout. This study also extends in two ways the previous literature examining the effect of psychiatric disorders on labor market outcomes. First, it controls for endogeneity between the individual's SES and mental health status by using information on the severity of parental mental disorders and the individual's mental disorders during schooling years. Second, it investigates the separate impacts of four major types of adult lifetime and current mental disorders on labor force participation and income in a nationally representative survey.

The findings have theoretical as well as policy implications. The theoretical implication suggests that mental health is an important factor to be included in the human capital model. Researchers on educational attainment should include parental and youth mental health status in survey instruments and analyses.

As Orazem and Tesfatsion (1993) have stated, without public intervention optimal investment in human capital in a society is difficult to achieve. A child's investment in human capital is initially dependent on genetic endowment and family environment rather than on his/her own innate ability. The results of my research indicate that there is considerable scope for policy intervention to improve environmental influences on children's schooling. Because my results are based on a nationally representative sample of the United States population, the sizable long-term impacts of parental and youth mental disorders reported here are doubtless great enough to be of policy interest.

Policy-makers weighing the cost and benefit of expenditure for treatment of psychiatric disorders need to be particularly sensitive to the costly impact of these

psychiatric disorders on children. It is apparent that the impact of parents' alcohol and drug abuse and/or dependence is more widely recognized than the impact of parents' anxiety and depression disorders. While the former's impact on high school completion is larger, the effect of the latter is also quite significant. These findings emphasize that policy initiatives designed to assist people suffering from mental illness may have important long-term indirect benefits by promoting higher levels of schooling attainment and socioeconomic success for the children of these people.

6.3 Limitation and Direction of Future Research

There were some limitations imposed on my analysis by using the NCS data. First, the overall survey response rate was 82.4% and also the sampling frame did not include the homeless or residents of institutions. Because individuals in these groups are more likely to have psychiatric disorders, results based on the NCS data may underestimate the proportion of people with early onset of psychiatric disorder (Kessler, 1995).

Second, errors in recalling lifetime psychiatric disorders and age of onset make the validity of this estimation somewhat questionable. Cook et al. (1993), in their study of drinking and schooling, suggest that although self-reported data about youthful drinking is downward biased, it is strongly positively correlated with actual drinking.

Third, due to data limitations, some potentially influential factors must be excluded from the analysis. The National Comorbidity Survey data do not include the region of residence during childhood. The region of residence is one of the most

important determinants of high school dropout. The rate of return for schooling is different in different regions based on the regions' different economic structures. Most studies compare the South to other regions. Having the location of residence during childhood would also allow for inclusion of local welfare benefits and estimation of potential earnings in the region where the respondent graduated from high school. Similarly, the NCS does not have school degrees or personal earnings.

Fourth, because information describing pharmaceutical therapy is not available for each episode of a disorder, I am unable to control for medications used by survey respondents with psychiatric disorders. Consequently, there is likely to be an omitted variable bias in my estimates. Finally, because no variables are available to identify an instrumental variable, my estimate of the impact of the individuals' mental disorders on the probability of high school dropout for women may be biased.

Replication of this study upon the release of a more recent survey containing more information about types of mental illness, more refined measures of current and past mental health, better measures family background characteristics and a measure of labor earnings is planned. Another project for future research is to extend Mullahy and Sindelar's study (1989) of the impact of alcohol abuse on occupational choice to other psychiatric disorders using the NCS data. Other future research could investigate the connections between teen parenting, mental illnesses, and the probability of dropping out of high school.

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APPENDICES

APPENDIX A.1

EXPANDING THE ROSEN-GRILICHES MODEL

Building from Becker's (1993) model of the determination of how family background and ability has effect on a child's schooling we can specify structural equations for the supply and demand for schooling and analyze the equilibrium level values of r and S. The marginal return to schooling of a child, denoted by MR, is given by the derivative of the child's future earnings (y) with respect to the child's schooling ability A: $\partial y/\partial A$. The marginal return is assumed to be an increasing function of schooling (S) and an increasing function of the child's ability A, but a decreasing function of parental (P) and schooling age (I) psychiatric disorders. Assuming the parental and own psychiatric disorders affect a person's opportunities, these two factors can be included implicitly in ability (A). In this specification, a person with parental and own psychiatric disorders has less ability (A) than other people do. The demand for schooling is given in equation (A1). The marginal rate of return is defined as a function of the amount of investment in schooling, and ability, with ability depending upon family background, including parental and own mental health:

(A1) $r_d = R(S, A(P,I))$,

where $MR_S = \partial R/\partial S < 0$,

$MR_A = \partial R/\partial A > 0$,

$MR_P = \partial R/\partial P = (\partial R/\partial A)(\partial A/\partial P) < 0$, and

$MR_I = \partial R/\partial I = (\partial R/\partial A)(\partial A/\partial I) < 0$.

The marginal cost of schooling (MC) represents the individual's opportunities. This marginal cost includes both the costs of funding and foregone earnings. If parents provide partial funding for schooling with a transfer (TR), this reduces the marginal cost of funding schooling. An individual with more ability (A) will accumulate more human capital for each dollar of investment, lowering the real cost of schooling. To the extent that parents' (P) and own youth (I) mental disorders reduce "ability," there will be an *indirect* increase in the marginal cost of schooling. Further, if parents' (P) or own youth (I) mental disorders reduce family income or family funding available to support children's schooling, then the marginal cost of schooling is *directly* increased.

The supply of schooling is given in equation (A2). Costs of schooling are defined as a function of the amount of schooling, ability, and parental and own mental health:

(A2) $r_s = C(S, TR, A(P,I), P, I)$,

where $MC_S = \partial C/\partial S > 0$,

$MC_A = \partial C/\partial A < 0$,

$MC_P = \partial C/\partial P + (\partial C/\partial A)(\partial A/\partial P) > 0$, and

$MC_I = \partial C/\partial I + (\partial C/\partial A)(\partial A/\partial I) > 0$.

The production of human capital is assumed to be subject to diminishing returns to all inputs, including time. The positive relationship between marginal cost and parental and own mental illness implies that people without parental or own mental illness have a lower cost of schooling per unit of investment.

Note that there is likely to be a positive correlation between the supply and demand for schooling because children from higher income families have higher

capacities and get greater psychic benefits from each additional investment in human capital. Because more able persons have lower real costs, they have a higher real return on investment in human capital, and tend to invest more in human capital than less able persons.

The optimal level of investment in human capital is obtained by equating the marginal cost to the expected marginal return:

(A3) $MC(S, TR, A(P,I), P, I) = MR(S, A(P,I))$.

Equilibrium values of r and S are illustrated in Figure 1 (p. 46). The reduced form equation for equilibrium schooling is given by

(A4) $S^* = s(r, TR, A(P, I), P, I)$.

Note that this is analogous to equation (8) in the text.

APPENDIX A.2

WHY DO WE PARTITION THE SAMPLE DATA INTO MEN AND WOMEN?

Previous studies suggest that the sex of the mentally ill parents and the type of the parents' mental illness have different impacts on their daughters and sons (e.g., Kenneth et al. 1997). By partitioning the sample data into two sub-groups, female and male, we can capture the different impact of parental mental illness separately on each of the two sub-groups boys and girls. Partitioning sample data into two subgroups also allows for defining the impact of different types of early psychiatric disorders in the girls and boys on their educational attainment separately (see Table A.1.)

Table A.1
WEIGHTED LOGISTIC ANALYSIS OF DROPOUT
CONTROLLING FOR PARENTAL MENTAL DISORDERS INTERFERES WITH LIFE (I)

	FEMALES & MALES		FEMALES		MALES	
Variable name	Odds Ratio	Parameter Estimate	OddsRatio	Parameter Estimate	OddsRatio	Parameter Estimate
IMOODFATH	0.51	-0.68	0.43	-0.85	0.73	-0.32
		(0.29)		(0.40)		(0.43)
IMOODMOTH	1.13	0.12	1.32	0.28	0.78	-0.24
		(0.24)		(0.34)		(0.38)
IAXFATH	1.07	0.07	2.28	0.82	0.41	-0.90
		(0.30)		(0.39)		(0.52)
IAXMOTH	1.21	0.19	0.83	-0.18	2.38	0.87
		(0.28)		(0.41)		(0.42)
ALCFATH	1.24	0.21	1.21	0.19	1.38	0.32
		(0.15)		(0.23)		(0.22)
ALCMOTH	1.46	0.38	2.10	0.74	0.95	-0.06
		(0.26)		(0.34)		(0.44)
DRGFATH	3.01	1.10	1.55	0.44	5.49	1.70
		(0.62)		(1.13)		(0.88)
DRGMOTH	1.10	0.10	1.67	0.51	1.74	0.55
		(0.89)		(1.06)		(5.93)
# OF OBSERVATIONS		3389		1757		1632
-2 LOG L		1778.4		777.0		914.7
Chi-square		386.0 (P =0.0001)		190.8 (P = 0.0001)		276.9 (P =0.0001)
DF		31		31		31
Log-likelihood ratio test -2LOGL = (190.8 + 276.9) - 386.0 = 467.7 - 386 = 81.7						
Adjusted for all control variables.						

The Likelihood ratio tests indicate that significant improvements are realized from estimating model in 2 separate groups, men and women. This statistic does support the adequacy of the main effects of model in two separate sample men and

women at P-value < 0.00010 level of acceptance, reinforcing the notion of greater efficiency when estimating a model with partitioning data to sample of men and women.

APPENDIX A.3

HETEROSCADASTICITY

Table A.2 reports test results for Hetroscedasticity between main variables of the model. The results do not show any statistically significant Hetroscedasticity between main variables at the acceptable level.

Table A. 2
TESTING FOR HETROSCEDASTICITY

	FEMALES		MALES	
Variable name	LRTEST	WALDTEST	LRTEST	WALDTEST
IMOODFATH	-0.154	0.574	0.464	0.206
IMOODMOTH	-0.151	0.583	0.421	0.197
IAXFATH	-0.119	0.558	0.407	0.197
IAXMOTH	-0.146	0.594	0.414	0.196
ALCFATH	-0.152	0.544	0.419	0.189
ALCMOTH	-0.153	0.577	0.467	0.196
DRGFATH	-0.103	0.555	0.444	0.192
DRGMOTH	-0.864	0.600	0.413	0.197
YOUTH DISORDER	-0.153	0.802	0.532	0.223
# OF OBSERVATIONS	1757		1632	

Adjusted for all control variables.

APPENDIX A.4

CORRECTED PREDICTED VALUE OF

FIRST STAGE IDENTIFYING VARIABLES

TABLE A.3
CORRECTED PREDICTED VALUE OF FIRST STAGE IDENTIFYING VARIABLES

MENTAL DISORDER	MOOD	ANXIETY	ALOCOHOL	DRUG
I-DAD-DISORDERS	73%	60%	71%	67%
I-MOM-DISORDERS	79%	63%	78%	77%
YOUTH DISORDER	68%	99%	65%	60%
I_DEPRESDAD	82%	59%	84%	86%
I-DEPRESMOM	80%	59%	82%	82%
I-ANXIETYDAD	84%	59%	88%	90%
I-ANXIETYMOM	85%	59%	85%	87%
ALCOHOLDAD	76%	60%	75%	74%
ALCOHOLMOM	85%	59%	88%	90%
H-DAD-DISORDERS	75%	61%	74%	72%
H-MOM-DISORDERS	83%	58%	85%	87%
YOUTH DISORDER	68%	99%	65%	60%
H_DEPRESDAD	85%	58%	90%	94%
H-DEPRESMOM	85%	57%	89%	93%
H-ANXIETYDAD	86%	58%	90%	95%
H-ANXIETYMOM	85%	57%	89%	94%
ALCOHOLDAD	76%	60%	75%	74%
ALCOHOLMOM	85%	59%	88%	90%

APPENDIX A.5

TABLES WITH ALL CONTROL VARIABLES

TABLE A.4.1.1
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT
CONTROLLING FOR PARENTAL MENTAL DISORDERS INTERFERES WITH LIFE
FOR FEMALES (N = 1757)*

SPECIFICATION	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
INTERCEPT						
OddsRatio						
MarginalEffect	-0.01	-0.15	-0.00	-0.01	-0.01	-0.01
StandardError	1.80	-0.32	1.03	1.86	1.87	1.87
AGE						
OddsRatio	0.85	0.85	0.85	0.86	0.83	0.87
MarginalEffect	-001	-0.01	-0.01	-0.01	-0.01	-0.00
StandardError	0.14	0.14	0.14	0.15	0.15	0.15
AGE2						
OddsRatio	1.00	1.00	1.00	1.00	1.00	1.00
MarginalEffect	0.00	0.00	0.00	0.00	0.00	0.00
StandardError	0.00	0.00	0.00	0.00	0.00	0.00
GOOD HEALTH						
OddsRatio	0.43 [a]	0.42 [a]	0.42 [a]	0.39 [a]	0.42 [a]	0.40 [a]
MarginalEffect	-0.04	-0.04	-0.04	-0.04	-0.04	-0.03
StandardError	0.27	0.27	0.27	0.28	0.28	0.30
BLACK						
OddsRatio	0.16 [a]	0.16 [a]	0.15 [a]	0.15 [a]	0.15 [a]	0.09 [a]
MarginalEffect	-0.09	-0.09	-0.08	-0.08	-0.08	-0.08
StandardError	0.44	0.44	0.44	0.45	0.45	0.50
HISPANIC						
OddsRatio	2.02 [C]	1.88	1.78	1.85	1.78	1.77
MarginalEffect	0.03	0.03	0.03	0.03	0.02	0.02
StandardError	0.43	0.43	0.43	0.44	0.44	0.45
OTHER RACES						
OddsRatio	1.14	1.19	1.17	1.19	1.14	1.31
MarginalEffect	0.01	0.01	0.01	0.01	0.01	0.01
StandardError	0.56	0.56	0.57	0.57	0.57	0.62
PROTESTANT						
OddsRatio	3.02 [a]	3.10 [a]	3.14 [a]	3.07 [a]	2.98 [a]	2.27 [a]
MarginalEffect	0.05	0.05	0.05	0.05	0.05	0.03
StandardError	0.29	0.28	0.29	0.29	0.29	0.30
OTHERRELIGION						
OddsRatio	1.14	1.07	0.99	0.97	0.91	0.70
MarginalEffect	0.01	0.00	-0.00	-0.00	-0.00	-0.01
StandardError	0.60	0.60	0.61	0.62	0.62	0.68
NO RELIGION						
OddsRatio	2.56 [b]	2.61 [b]	2.57 [b]	2.86 [b]	2.68 [b]	2.79 [b]
MarginalEffect	0.04	0.04	0.04	0.04	0.04	0.03
StandardError	0.43	0.43	0.44	0.45	0.45	0.47
ENGLISH						
OddsRatio	1.26	1.28	1.33	1.26	1.25	1.23
MarginalEffect	0.01	0.01	0.01	0.01	0.00	0.01
StandardError	0.34	0.34	0.35	0.35	0.35	0.37
INTACT						
OddsRatio	0.66	0.70	0.73	0.72	0.75	0.89
MarginalEffect	-0.02	-0.02	-0.01	-0.01	-0.01	-0.00
StandardError	0.26	0.25	0.27	0.27	0.28	0.30
PARENT-EDUCATION						
OddsRatio	0.83 [a]	0.83 [a]	0.83 [a]	0.82 [a]	0.83 [a]	0.83 [a]
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
StandardError	0.03	0.03	0.03	0.03	0.03	0.03

(Continued on following page)

TABLE A.4.1.1 (CONTINUED)

SPECIFICATIONS	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
BETTER THAN AVG						
OddsRatio	1.02	1.03	1.08	1.12	1.09	0.80
MarginalEffect	0.00	0.00	0.00	0.00	0.00	-0.01
StandardError	0.27	0.27	0.27	0.27	0.27	0.29
WORSE THAN AVG						
OddsRatio	0.57	0.51 [C]	0.51 [b]	0.56 [C]	0.55 [c]	0.59
MarginalEffect	-0.03	-0.03	-0.03	-0.02	-0.02	-0.02
StandardError	0.35	0.35	0.36	0.36	0.37	0.38
SIBLINGS						
OddsRatio	1.14 [a]	1.15 [a]	1.14 [a]	1.13 [a]	1.14 [a]	1.10 [b]
MarginalEffect	0.01	0.01	0.01	0.01	0.01	0.00
StandardError	0.04	0.04	0.04	0.04	0.04	0.04
MOVED						
OddsRatio	1.03	1.03	1.02	1.03	1.02	1.02
MarginalEffect	0.00	0.00	0.00	0.00	0.00	0.00
StandardError	0.02	0.02	0.02	0.02	0.02	0.02
RURAL						
OddsRatio	0.50 [a]	0.49 [a]	0.50 [a]	0.49 [a]	0.51 [a]	0.56 [b]
MarginalEfffect	-0.03	-0.03	-0.03	-0.03	-0.03	-0.02
StandardError	0.26	0.27	0.27	0.27	0.27	0.28
NORTHEAST						
OddsRatio	1.04	1.05	1.03	0.96	0.94	0.81
MarginalEffect	0.00	0.00	0.00	-0.00	-0.00	-0.01
StandardError	0.30	0.30	0.30	0.31	0.31	0.33
MIDWEST						
OddsRatio	1.47	1.48	1.60	1.43	1.43	1.41
MarginalEffect	0.02	0.02	0.02	0.02	0.01	0.01
StandardError	0.25	0.25	0.25	0.25	0.25	0.27
WEST						
OddsRatio	0.73	0.73	0.70	0.66	0.64	0.51 [c]
MarginalEffect	-0.02	-0.01	-0.02	-0.02	-0.02	-0.02
StandardError	0.33	0.33	0.33	0.34	0.34	0.36
MAX-UEMPLOYMENT						
OddsRatio	1.02	1.02	1.02	1.01	1.00	0.94
MarginalEffect	0.00	0.00	0.00	0.00	0.00	-0.00
StandardError	0.10	0.10	0.10	1.10	0.11	0.11
MIN-UEMPLOYMENT						
OddsRatio	1.12	1.13	1.11	1.12	1.15	1.21
MarginalEffect	0.01	0.01	0.00	0.00	0.01	0.01
StandardError	0.14	0.14	0.14	0.15	0.15	0.15
VIETNAM						
OddsRatio	0.76	0.75	0.70	0.72	0.81	0.61
MarginalEffect	-0.01	-0.01	-0.02	-0.01	-0.01	-0.02
StandardError	0.36	0.37	0.37	0.38	0.38	0.40
I-DAD-DISORDER						
OddsRatio		1.05				
MarginalEffect		0.00				
StandardError		0.21				
I-MOM-DISORDER						
OddsRatio		1.53 [c]				
MarginalEffect		0.02				
StandardError		0.23				
I-DEPRESSION-DAD						
OddsRatio			0.43 [b]	0.11 [b]	0.10 [b]	0.10 [a]
MarginalEffect			-0.04	-0.09	-0.09	-0.08
StandardError			0.40	0.98	0.98	0.93
I-DEPRESSION-MOM						
OddsRatio			1.32	2.01 [c]	1.89 [c]	1.34
MarginalEffect			0.01	0.03	0.03	0.01
StandardError			0.34	0.37	0.37	0.40

(Continued on following page)

TABLE A.4.1.1 (CONTINUED)

SPECIFICATIONS	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
I-ANXIETY-DAD						
OddsRatio			2.28 [b]	2.16	2.12	2.32
MarginalEffect			0.04	0.03	0.03	0.03
StandardError			0.39	0.71	0.71	0.73
I-ANXIETY-MOM						
OddsRatio			0.83	0.83	0.74	1.03
MarginalEffect			-0.01	-0.01	-0.01	0.00
StandardError			0.41	0.84	0.85	0.83
ALCOHOL-DAD						
OddsRatio			1.21	1.25	1.21	1.19
MarginalEffect			0.01	0.01	0.01	0.01
StandardError			0.23	0.26	0.26	0.27
ALCOHOL-MOM						
OddsRatio			2.10 [b]	1.69	1.70	1.36
MarginalEffect			0.03	0.02	0.02	0.01
StandardError			0.34	0.45	0.45	0.49
DRUG-DAD						
OddsRatio			1.55	23.5 [b]	17.4 [c]	29.4 [b]
MarginalEffect			0.02	0.13	0.12	0.11
StandardError			1.13	1.62	1.64	1.67
DRUG-MOM						
OddsRatio			1.67	3.68	4.14	5.13
MarginalEffect			0.02	0.06	0.06	0.05
StandardError			1.06	1.60	1.61	1.64
I-DEPRESSION&ANXIETY-DAD						
OddsRatio				3.83	3.77	2.27
MarginalEffect				0.06	0.06	0.03
StandardError				0.93	0.94	0.96
I-DEPRESSION&ANXIETY-MOM						
OddsRatio				0.46	0.50	0.57
MarginalEffect				-0.03	-0.03	-0.02
StandardError				0.92	0.92	0.93
I-DEPRESSION&ALCOHOL-DAD						
OddsRatio				3.11	3.31	4.55
MarginalEffect				0.05	0.05	0.05
StandardError				1.00	1.00	1.00
I-DEPRESSION&ALCOHOL-MOM						
OddsRatio				0.33	0.32	0.61
MarginalEffect				-0.05	-0.05	-0.02
StandardError				0.97	0.96	1.01
I-ANXIETY-ALCOHOL-DAD						
OddsRatio				0.53	0.50	0.37
MarginalEffect				-0.03	-0.03	-0.03
StandardError				0.92	0.92	0.95
IANXIETY&ALCOHOL-MOM						
OddsRatio				5.83 [c]	5.71 [c]	5.03
MarginalEffect				0.07	0.07	0.05
StandardError				1.00	1.00	1.03
ALCOHOL&DRUG-DAD						
OddsRatio				0.02 [c]	0.02 [c]	0.02 [c]
MarginalEffect				-0.17	-0.16	-0.14
StandardError				2.22	2.21	2.19
ALCOHOL&DRUG-MOM						
OddsRatio				0.21	0.19	0.11
MarginalEffect				-0.07	-0.07	-0.07
StandardError				2.17	2.18	2.35
YOUTH DISORDER						
OddsRatio					1.64 [b]	1.30
MarginalEffect					0.02	0.01
StandardError					0.21	0.23

(Continued on following page)

TABLE A.4.1.1 (CONTINUED)

SPECIFICATIONS	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
TEENCHILD						
OddsRatio						7.78 [a]
MarginalEffect						0.07
StandardError						0.33

SPECIFICATIONS	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
-2 LOG L	789.7	786.2	777.0	764.2	758.8	688.4
Chi-square	178.1	181.5	190.8	203.6	208.9	279.3
DF	23	25	31	39	40	41

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 1 vs. 2	3.5	0.25
Specification 1 vs. 3	9.2	0.25
Specification 3 vs. 4	12.8	0.25
Specification 4 vs. 5	5.4	0.025
Specification 5 vs. 6	70.4	0.00

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

TABLE A.4.1.2
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT
CONTROLLING FOR PARENTAL MENTAL DISORDERS IN CASE OF HOSPITALIZATION
FOR FEMALES (N =1757)*

SPECIFICATIONS	(1)	(2H)	(3H)	(4H)	(5H)	(6H)[38]
AGE						
OddsRatio	0.85	0.86	0.86	0.83	0.79	
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.01	
StandardError	0.14	0.15	0.15	0.15	0.15	
AGE2						
OddsRatio	1.00	1.00	1.00	1.00	1.00	
MarginalEffect	0.00	-0.00	0.00	0.00	0.00	
StandardError	.0.00	0.00	0.00	0.00	0.00	
GOOD HEALTH						
OddsRatio	0.43 [a]	0.42 [a]	0.44 [a]	0.42 [a]	0.45 [a]	
MarginalEffect	-0.04	-0.04	-0.03	-0.04	-0.03	
StandardError	0.27	0.27	0.27	0.28	0.28	
BLACK						
OddsRatio	0.16 [a]	0.15 [a]	0.14 [a]	0.14 [a]	0.15 [a]	
MarginalEffect	-0.08	-0.08	-0.09	-0.08	-0.08	
StandardError	0.44	0.45	0.46	0.46	0.46	
HISPANIC						
OddsRatio	2.02 [c]	1.90	1.98	1.88	1.83	
MarginalEffect	0.03	0.03	0.03	0.03	0.03	
StandardError	0.43	0.42	0.43	0.43	0.43	
OTHRACE						
OddsRatio	1.14	1.25	1.28	1.34	1.29	
MarginalEffect	0.01	0.01	0.01	0.01	0.01	
StandardError	0.56	0.56	0.56	0.57	0.56	
PROTESTANT						
OddsRatio	3.02 [a]	3.22 [a]	3.26 [a]	3.18 [a]	3.08 [a]	
MarginalEffect	0.05	0.05	0.05	0.05	0.05	
StandardError	0.29	0.29	0.29	0.29	0.29	
OTHERRELIGION						
OddsRatio	1.14	1.17	1.20	1.19	1.11	
MarginalEffect	0.01	0.01	0.01	0.01	0.00	
StandardError	0.60	0.60	0.61	0.61	0.61	
NO RELIGION						
OddsRatio	2.56 [b]	2.72 [b]	2.92 [a]	3.07 [b]	2.85 [b]	
MarginalEffect	0.04	0.05	0.05	0.05	0.04	
StandardError	0.43	0.44	0.44	0.44	0.45	
ENGLISH						
OddsRatio	1.26	1.32	1.28	1.22	1.21	
MarginalEffect	0.01	0.01	0.01	0.01	0.01	
StandardError	0.34	0.34	0.34	0.35	0.35	
INTACT						
OddsRatio	0.66	0.74	0.77	0.71	0.74	
MarginalEffect	-0.02	-0.01	-0.01	-0.01	-0.01	
StandardError	0.26	0.27	0.27	0.28	0.28	
PARENT-EDUCATION						
OddsRatio	0.83 [a]	0.83 [a]	0.83 [a]	0.82 [a]	0.83 [a]	
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.01	
StandardError	0.03	0.03	0.03	0.03	0.03	

(Continued on folowing page)

[38] Due to the high multicollinearity, the convergence for this specification (including TEENCHILD) did not obtain.

TABLE A.4.1.2 (CONTINUED)

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)
BETTER THAN AVG					
OddsRatio	1.02	1.08	1.03	1.04	1.01
MarginalEffect	0.00	0.00	0.00	0.00	0.00
StandardError	0.27	0.27	0.27	0.27	0.27
WORSE THAN AVG					
OddsRatio	0.57 [b]	0.47 [b]	0.51 [c]	0.53 [c]	0.52 [c]
MarginalEffect	-0.03	-0.03	-0.03	-0.03	-0.03
StandardError	0.35	0.36	0.36	0.37	0.37
SIBLINGS					
OddsRatio	1.14 [a]	1.15 [a]	1.16 [a]	1.15 [a]	1.16 [a]
MarginalEffect	0.01	0.01	0.01	0.01	0.01
StandardError	0.04	0.04	0.04	0.04	0.04
MOVED					
OddsRatio	1.03	1.02	1.02	1.03	1.02
MarginalEffect	0.00	0.00	0.00	0.00	0.00
StandardError	0.02	0.02	0.02	0.02	0.02
RURAL					
OddsRatio	0.50 [a]	0.49 [a]	0.48 [a]	0.49 [a]	0.50 [a]
MarginalEfffect	-0.03	-0.03	-0.03	-0.03	-0.03
StandardError	0.26	0.27	0.27	0.28	0.28
NORTHEAST					
OddsRatio	1.04	1.05	1.04	1.11	1.09
MarginalEffect	0.00	0.00	0.00	0.00	0.00
StandardError	0.30	0.30	0.30	0.31	0.31
MIDWEST					
OddsRatio	1.50	1.46	1.44	1.47	1.48
MarginalEffect	0.02	0.02	0.02	0.02	0.02
StandardError	0.25	0.25	0.25	0.26	0.26
WEST					
OddsRatio	0.72	0.72	0.71	0.70	0.68
MarginalEffect	-0.02	-0.02	-0.02	-0.02	-0.02
StandardError	0.33	0.33	0.33	0.34	0.34
MAX-UEMPLOYMENT					
OddsRatio	1.02	1.01	1.01	0.99	0.98
MarginalEffect	0.00	0.00	0.00	-0.00	-0.00
StandardError	0.10	0.10	0.10	0.11	0.11
MIN-UEMPLOYMENT					
OddsRatio	1.12	1.12	1.11	1.17	1.20
MarginalEffect	0.01	0.01	0.00	0.01	0.01
StandardError	0.14	0.14	0.14	0.15	0.15
VIETNAMWAR					
OddsRatio	0.76	0.71	0.68	0.73	0.83
MarginalEffect	-0.01	-0.02	-0.02	-0.01	-0.01
StandardError	0.36	0.37	0.37	0.38	0.38
H-DAD-DISORDER					
OddsRatio		1.24			
MarginalEffect		0.01			
StandardError		0.22			
H-MOM-DISORDER					
OddsRatio		2.37 [a]			
MarginalEffect		0.04			
StandardError		0.26			
H-DEPRESSION-DAD					
OddsRatio			0.75	0.03	0.02
MarginalEffect			-0.01	-0.15	-0.16
StandardError			0.74	2.81	2.81
H-DEPRESSION-MOM					
OddsRatio			2.69 [c]	4.29 [a]	4.60 [a]
MarginalEffect			0.04	0.06	0.06
StandardError			0.52	0.52	0.52

(Continued on following page)

TABLE A.4.1.2 (CONTINUED)

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)
H-ANXIETY-DAD					
OddsRatio			4.59 [b]	4.00	2.98
MarginalEffect			0.07	0.06	0.05
StandardError			0.75	1.67	1.66
H-ANXIETY-MOM					
OddsRatio			0.62	16.3 [b]	13.7 [c]
MaginalEffect			-0.02	0.12	0.11
StandardError			0.66	1.40	1.38
ALCOHOL-DAD					
OddsRatio			1.11	1.07	1.02
MarginalEffect			0.00	0.00	0.00
StandardError			0.23	0.24	0.24
ALCOHOL-MOM					
OddsRatio			2.00 [b]	2.03 [b]	1.95 [c]
MarginalEffect			0.03	0.03	0.03
StandardError			0.34	0.36	0.36
DRUG-DAD					
OddsRatio			1.37	10.6	7.55
MarginalEffect			0.01	0.10	0.08
StandardError			1.12	1.87	1.91
DRUG-MOM					
OddsRatio			1.18	1.58	1.75
MarginalEffect			0.01	0.02	0.02
StandardError			1.07	1.84	1.86
H-DEPRESSION&ANXIETY-DAD					
OddsRatio				14.2	20.3
MarginalEffect				0.11	0.12
StandardError				2.22	2.22
H-DEPRESSION&ANXIETY-MOM					
OddsRatio				0.01 [a]	0.01 [a]
MarginalEffect				-0.19	-0.18
StandardError				1.69	1.67
H-DEPRESSION&ALCOHOL-DAD					
OddsRatio				14.5	15.6
MarginalEffect				0.11	0.11
StandardError				2.49	2.50
H-DEPRESSION&ALCOHOL-MOM					
OddsRatio				0.29	0.21
MarginalEffect				-0.05	-0.07
StandardError				2.11	2.12
H-ANXIETY&ALCOHOL-DAD					
OddsRatio				0.30	0.33
MarginalEffect				-0.05	-0.05
StandardError				2.26	2.27
H-ANXIETY-ALCOHOL-MOM					
OddsRatio				8.60	11.6
MarginalEffect				0.09	0.10
StandardError				2.41	2.42
ALCOHOL-DRUG					
OddsRatio				0.05	0.06
MarginalEffect				-0.13	-0.12
StandardError				2.31	2.33
ALCOHOL&DRUG					
OddsRatio				0.53	0.51
MarginalEffect				-0.03	-0.03
StandardError				2.29	2.31
YOUTH DISORDER					
OddsRatio					1.70 [a]
MarginalEffect					0.02
StandardError					0.21

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TABLE A.4.1.2 (CONTINUED)

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)
-2 LOG L	789.7	778.1	773.6	760.6	754.4
Chi-square	178.1	189.6	194.2	207.2	213.4
DF	23	25	31	39	40

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 1 vs. 2	11.6	0.001
Specification 1 vs. 3	16.1	0.05
Specification 3 vs. 4	13	0.10
Specification 4 vs. 5	6.2	0.01

Marginal effects are partial derivative with respect to the vector of characteristics. Computed at the means of the Xs

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

TABLE A.4.2.1
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT
CONTROLLING FOR PARENTAL MENTAL DISORDERS INTERFERES WITH LIFE
FOR MALES (N= 1632)*

SPECIFICATION	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
INTERCEPT						
OddsRatio	.					
MarginalEffect	0.20[c]	0.01[b]	0.19[b]	0.20[b]	0.12	0.10
StandardError	1.73	1.73	1.76	1.79	1.82	1.84
AGE						
OddsRatio	0.89	0.89	0.090	0.91	0.96	0.97
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.00	-0.00
StandardError	0.09	0.09	0.90	0.09	0.09	0.09
AGE2						
OddsRatio	1.00	1.00	1.00	1.00	1.00	1.00
MarginalEffect	0.00	0.00	0.00	0.00	0.00	0.00
StandardError	0.00	0.00	0.00	0.00	0.00	0.00
GOOD HEALTH						
OddsRatio	0.40[a]	0.41[a]	0.36[a]	0.36[a]	0.40[a]	0.36[a]
MarginalEffect	-0.05	-0.05	-0.06	-0.06	-0.05	-0.05
StandardError	0.27	0.28	0.28	0.29	0.30	0.30
BLACK						
OddsRatio	1.01	1.00	1.03	1.08	1.18	1.29
MarginalEffect	0.00	0.00	0.00	0.00	0.02	0.01
StandardError	0.31	0.31	0.31	0.32	0.33	0.33
HISPANIC						
OddsRatio	1.35	1.34	1.37	1.37	1.41	1.42
MarginalEffect	0.02	0.02	0.02	0.02	0.02	0.02
StandardError	0.31	0.31	0.32	0.32	0.33	0.33
OTHERRACES						
OddsRatio	0.23[a]	0.24[a]	0.25[b]	0.26[c]	0.26[b]	0.27[b]
MarginalEffect	-0.09	-0.09	-0.08	-0.08	-0.07	-0.07
StandardError	0.59	0.60	0.60	0.60	0.61	0.61
PROTESTANT						
OddsRatio	0.75	0.74	0.70	0.66[c]	0.62[b]	0.60[b]
MarginalEffect	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03
StandardError	0.22	0.23	0.23	0.23	0.23	0.24
OTHRRELIGION						
OddsRatio	0.59	0.60	0.55	0.54	0.43[c]	0.44[c]
MarginalEffect	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04
StandardError	0.46	0.46	0.46	0.47	0.47	0.47
NO RELIGION						
OddsRatio	0.95	0.93	0.79	0.77	0.70	0.73
MarginalEffect	-0.00	-0.00	-0.01	-0.01	-0.02	-0.02
StandardError	0.33	0.33	0.34	0.35	0.36	0.36
ENGLISH						
OddsRatio	1.02	1.01	0.97	0.97	1.06	1.21
MarginalEffect	0.00	0.00	-0.00	-0.00	0.00	0.01
StandardError	0.27	0.27	0.28	0.28	0.29	0.29
INTACT FAMILY						
OddsRatio	0.90	0.91	0.90	0.92	0.88	0.84
MarginalEffect	-0.01	-0.01	-0.01	-0.00	-0.01	-0.01
StandardError	0.25	0.03	0.26	0.26	0.27	0.27
PARENT-EDUCATION						
OddsRatio	0.79[a]	0.79[a]	0.78[a]	0.78[a]	0.77[a]	0.78[a]
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
StandardError	0.03	0.03	0.03	0.03	0.03	0.03

(Continued on following page)

TABLE A.4.2.1(CONTINUED)

SPECIFICATION	(1)	(2I)	(3I)	(4I)	(5I)	(6I)
BETTER THAN AVG						
OddsRatio	1.10	1.10	1.10	1.11	1.12	1.17
MarginalEffect	0.01	0.01	0.01	0.01	0.00	0.01
StandardError	0.24	0.24	0.24	0.25	0.25	0.25
WORSE THAN AVG						
OddsRatio	0.73	0.71	0.67	0.68	0.65	0.62
MarginalEffect	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
StandardError	0.28	0.28	0.30	0.30	0.30	0.31
SIBLINGS						
OddsRatio	1.16 [a]	1.16 [a]	1.15 [a]	1.15 [a]	1.13 [a]	1.12 [a]
MarginalEffect	0.01	0.01	0.01	0.01	0.01	0.01
StandardError	0.03	0.03	0.04	0.03	0.04	0.04
MOVED						
OddsRatio	1.09 [a]	1.08 [a]	1.09 [a]	1.09 [a]	1.08 [a]	1.07 [a]
MarginalEffect	0.01	0.00	0.00	0.00	0.00	0.00
StandardError	0.03	0.03	0.03	0.03	0.03	0.03
RURAL						
OddsRatio	1.06	1.06	1.06	1.09	1.12	1.16
MarginalEffect	0.00	0.00	0.00	0.00	0.01	0.01
StandardError	0.21	0.21	0.21	0.22	0.22	0.22
NORTHEAST						
OddsRatio	0.67	0.65	0.65	0.66	0.69	0.75
MarginalEffect	-0.02	-0.03	-0.02	-0.02	-0.02	-0.01
StandardError	0.27	0.27	0.28	0.28	0.28	0.28
MIDWEST						
OddsRatio	0.62 [b]	0.61 [b]	0.62 [c]	0.63 [c]	0.64 [c]	0.69
MarginalEffect	-0.03	-0.03	-0.03	-0.03	-0.02	-0.02
StandardError	0.25	0.25	0.25	0.25	0.25	0.25
WEST						
OddsRatio	0.76	0.74	0.79	0.83	0.78	0.77
MarginalEffect	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01
StandardError	0.27	0.27	0.27	0.27	0.28	0.28
MAX-UEMPLOYMENT						
OddsRatio	0.84 [b]	0.84 [b]	0.85 [b]	0.85 [b]	0.85 [b]	0.86 [c]
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
StandardError	0.08	0.08	0.08	0.08	0.08	0.08
MIN-UEMPLOYMENT						
OddsRatio	1.24 [b]	1.23 [b]	1.21 [c]	1.20 [c]	1.19 [c]	1.18
MarginalEffect	0.01	0.01	0.01	0.01	0.01	0.01
StandardError	0.10	0.10	0.10	0.10	0.10	0.10
VIETNAMWAR						
OddsRatio	0.70	0.69	0.67	0.63	0.59	0.56 [c]
MarginalEffect	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03
StandardError	0.34	0.34	0.34	0.34	0.34	0.35
I-DAD-HIST						
OddsRatio		1.18				
MarginalEffect		0.01				
StandardError		0.20				
I-MOM-HIST						
OddsRatio		1.06				
MarginalEffect		0.00				
StandardError		0.25				
I-DEPRESSION-DAD						
OddsRatio			0.73	1.38	1.49	1.42
MarginalEffect			-0.02	0.02	0.02	0.02
StandardError			0.43	0.62	0.60	0.61
I-DEPRESSION-MOM						
OddsRatio			0.78	0.81	0.65	0.62
MarginalEffect			-0.01	-0.01	-0.01	-0.02
StandardError			0.38	0.46	0.47	0.48

(Continued on following page)

TABLE A.4.2.1(CONTINUED)

SPECIFICATION	(1)	(2I)	(3I)	(4I)	(5I)	6(6)
I-ANXIETY-DAD						
OddsRatio			0.41[c]	0.25	0.22	0.20
MarginalEffect			-0.05	-0.08	-0.08	-0.08
StandardError			0.52	1.09	1.05	1.07
I-ANXIETY-MOM						
OddsRatio			2.38[b]	2.16	2.06	2.04
MarginalEffect			0.05	0.04	0.04	0.04
StandardError			0.42	0.70	0.72	0.73
ALCOHOL-DAD						
OddsRatio			1.38	1.61[b]	1.42	1.38
MarginalEffect			0.02	0.03	0.02	0.02
StandardError			0.22	0.23	0.23	0.24
ALCOHOL-MOM						
OddsRatio			0.95	0.52	0.47	0.45
MarginalEffect			-0.00	-0.04	-0.04	-0.04
StandardError			0.44	0.60	0.61	0.59
DRUG-DAD						
OddsRatio			5.49[b]	2.11	2.40	2.58
MarginalEffect			0.10	0.04	0.05	0.05
StandardError			0.88	1.76	1.71	1.71
DRUG-MOM						
OddsRatio			1.74	0.91	0.90	0.71
MarginalEffect			0.03	-0.01	-0.01	-0.02
StandardError			5.93	8.85	7.38	8.89
I-DEPRESSION&ANXIETY-DAD						
OddsRatio				1.74	1.73	2.02
MarginalEffect				0.03	0.03	0.04
StandardError				1.13	1.13	1.16
I-DEPRESSION&ANXIETY-MOM						
OddsRatio				0.83	0.96	0.94
MarginalEffect				-0.01	-0.00	-0.00
StandardError				0.89	0.92	0.94
I-DEPRESSION&ALCOHOL-DAD						
OddsRatio				0.21[c]	0.25	0.25
MarginalEffect				-0.09	-0.07	-0.07
StandardError				0.86	0.86	0.87
I-DEPRESSION&ALCOHOL-MOM						
OddsRatio				1.22	1.57	1.74
MarginalEffect				0.01	0.02	0.03
StandardError				1.39	1.41	1.42
I-ANXIETY-ALCOHOL-DAD						
OddsRatio				1.38	1.30	1.40
MarginalEffect				0.02	0.01	0.02
StandardError				1.05	1.05	1.07
I-ANXIETY-ALCOHOL-MOM						
OddsRatio				8.30	5.58	4.46
MarginalEffect				0.12	0.09	0.08
StandardError				1.49	1.50	1.51
ALCOHOL-DRUG-DAD						
OddsRatio				3.89	2.91	2.73
MarginalEffect				0.08	0.06	0.05
StandardError				2.04	1.99	1.98

(Continued on following page)

TABLE A.4.2.1(CONTINUED)

SPECIFICATION	(1)	(2I)	3I)	(4I)	(5I)	(6I)
YOUTH DISORDER						
OddsRatio					2.54 [a]	2.47 [a]
MarginalEffect					0.05	0.05
StandardError					0.20	0.20
TEENCHILD						
OddsRatio						3.39 [a]
MarginalEffect						0.06
StandardError						0.30
-2 LOG L	931.6	930.8	914.7	905.0	883.7	868.1
Chi-square	260.0	260.8	276.9	286.6	307.9	323.5
DF	23	25	31	38	39	40

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification 1 vs. 2	0.8	0.95
Specification 1 vs. 3	16.1	0.05
Specification 3 vs. 4	9.7	0.25
Specification 4 vs. 5	21.3	0.00
Specification 5 vs. 6	15.6	0.00

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

ALCOHOL&DRUG-MOM due to high collinearity with other variables in this model has been dropped.

TABLE A.4.2.2
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT
CONTROLLING FOR PARENTAL MENTAL DISORDERS CASE OF HOSPITALIZATION
FOR MALES (N=1632)*

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)	(6H)
INTERCEPT						
adroit						
MarginalEffect	0.20[c]	0.20[b]	0.20[b]	0.18[b]	0.12	0.10
StandardError	1.73	1.73	1.78	1.79	1.81	1.83
AGE						
OddsRatio	0.89	0.89	0.91	0.92	0.96	0.97
MarginalEffect	-0.01	-0.01	-0.01	-0.00	-0.00	-0.00
StandardError	0.09	0.09	0.09	0.09	0.09	0.09
AGE2						
OddsRatio	1.00	1.00	1.00	1.00	1.00	1.00
MarginalEffect	0.00	0.00	0.00	0.00	0.00	0.00
StandardError	0.00	0.00	0.00	0.00	0.00	0.00
GOOD HEALTH						
OddsRatio	0.40[a]	0.40[a]	0.34[a]	0.33[a]	0.38[a]	0.34[a]
MarginalEffect	-0.05	-0.05	-0.06	-0.06	-0.05	-0.05
StandardError	0.27	0.27	0.28	0.29	0.30	0.30
BLACK						
OddsRatio	1.01	1.01	1.03	1.12	1.51	1.35
MarginalEffect	0.00	0.00	0.00	0.01	0.02	0.01
StandardError	0.31	0.31	0.31	0.32	0.32	0.33
HISPANIC						
OddsRatio	1.35	1.34	1.37	1.39	1.46	1.48
MarginalEffect	0.02	0.02	0.02	0.02	0.02	0.02
StandardError	0.31	0.31	0.32	0.33	0.33	0.33
OTHRACE						
OddsRatio	0.23[a]	0.23[a]	0.26[b]	0.26[b]	0.28[b]	0.30[b]
MarginalEffect	-0.09	-0.09	-0.07	-0.07	-0.07	-0.06
StandardError	0.59	0.60	0.60	0.60	0.61	0.60
PROTESTANT						
OddsRatio	0.75	0.74	0.77	0.73[c]	0.68[c]	0.65[c]
MarginalEffect	-0.02	-0.02	-0.01	-0.02	-0.02	-0.02
StandardError	0.22	0.23	0.23	0.23	0.23	0.24
OTHERRELIGION						
OddsRatio	0.59[a]	0.59	0.64	0.63	0.52	0.51
MarginalEffect	-0.03	-0.03	-0.03	-0.02	-0.03	-0.03
StandardError	0.46	0.46	0.46	0.46	0.47	0.47
NO RELIGION						
OddsRatio	0.95	0.93	0.88	0.84	0.74	0.78
MarginalEffect	-0.00	-0.00	-0.01	-0.01	-0.02	-0.01
StandardError	0.33	0.34	0.34	0.34	0.35	0.35
ENGLISH						
OddsRatio	1.02	1.01	0.99	0.97	1.04	1.17
MarginalEffect	0.00	0.00	-0.00	-0.00	0.00	0.01
StandardError	0.27	0.27	0.29	0.29	0.29	0.29
INTACT FAMILY						
OddsRatio	0.89	0.90	0.88	0.93	0.88	0.86
MarginalEffect	-0.01	-0.01	-0.01	-0.00	-0.01	-0.01
StandardError	0.25	0.25	0.26	0.26	0.27	0.27
PARENT-EDUCATION						
OddsRatio	0.79[a]	0.79[a]	0.78[a]	0.78[a]	0.77[a]	0.78[a]
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
StandardError	0.03	0.03	0.03	0.03	0.03	0.03
BETTER THAN AVG						
OddsRatio	1.09	1.10	1.09	1.10	1.10	1.15
MarginalEffect	0.01	0.01	0.00	0.01	0.00	0.01
StandardError	0.24	0.24	0.24	0.24	0.24	0.25

(Continued on following page)

TABLE A.4.2.2 (CONTINUED)

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)	(6H)
WORSE THAN AVG						
OddsRatio	0.73	0.72	0.59 [c]	0.63	0.61 [c]	0.59 [c]
MarginalEffect	-0.02	-0.02	-0.03	-0.02	-0.03	-0.03
StandardError	0.28	0.28	0.30	0.30	0.30	0.31
SIBLINGS						
OddsRatio	1.16 [a]	1.16 [a]	1.16 [a]	1.16 [a]	1.14 [a]	1.13 [a]
MarginalEffect	0.01	0.01	0.01	0.01	0.01	0.01
StandardError	0.03	0.03	0.03	0.03	0.04	0.04
MOVED						
OddsRatio	1.10 [a]	1.09 [a]	1.09 [a]	1.09 [a]	1.08 [a]	1.07 [b]
MarginalEffect	0.01	0.00	0.00	0.00	0.00	0.00
StandardError	0.03	0.03	0.03	0.03	0.03	0.03
RURAL						
OddsRatio	1.06	1.06	1.10	1.13	1.16	1.19
MarginalEffect	0.00	0.00	0.01	0.01	0.01	0.01
StandardError	0.21	0.21	0.22	0.22	0.22	0.22
NORTHEAST						
OddsRatio	0.67	0.66	0.67	0.70	0.73	0.79
MarginalEffect	-0.02	-0.02	-0.02	-0.02	-0.02	-0.01
StandardError	0.27	0.27	0.28	0.28	0.28	0.28
MIDWEST						
OddsRatio	0.62 [b]	0.61 [b]	0.59 [c]	0.60 [b]	0.62 [c]	0.67
MarginalEffect	-0.03	-0.03	-0.03	-0.03	-0.02	-0.02
StandardError	0.25	0.25	0.25	0.25	0.25	0.26
WEST						
OddsRatio	0.76	0.75	0.81	0.86	0.80	0.79
MarginalEffect	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01
StandardError	0.27	0.27	0.27	0.28	0.28	0.29
MAX-UEMPLOYMENT						
OddsRatio	0.84 [b]	0.84 [b]	0.84 [c]	0.84 [b]	0.84 [b]	0.85 [a]
MarginalEffect	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
StandardError	0.08	0.08	0.08	0.08	0.08	0.08
MIN-UEMPLOYMENT						
OddsRatio	1.24 [b]	1.24 [b]	1.20 [c]	1.22 [b]	1.19 [c]	1.19 [a]
MarginalEffect	0.01	0.01	0.01	0.01	0.01	0.01
StandardError	0.10	0.10	0.10	0.10	0.10	0.10
VIETNAMWAR						
OddsRatio	0.70	0.69	0.65	0.63	0.58	0.55 [c]
MarginalEfffect	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03
StandardError	0.34	0.34	0.34	0.34	0.35	0.35
H-DAD-HIST						
OddsRatio		1.12				
MarginalEffect		0.01				
StandardError		0.21				
H-MOM-HIST						
OddsRatio		0.99				
MarginalEffect		-0.00				
StandardError		0.32				
H-DEPRESSION-DAD						
OddsRatio			2.17	2.44	2.40	2.72
MarginalEffect			0.04	0.05	0.04	0.05
StandardError			0.93	1.37	1.42	1.38
H-DEPRESSION-MOM						
OddsRatio			0.26 [a]	0.01 [c]	0.02 [c]	0.02 [c]
MarginalEffect			-0.08	-0.23	-0.20	-0.20
StandardError			0.68	2.36	2.32	2.33
H-ANXIETY-DAD						
OddsRatio			0.05 [a]	0.04 [b]	0.05 [b]	0.05 [b]
MarginalEffect			-0.17	-0.18	-0.15	-0.15
StandardError			1.25	1.39	1.41	1.38

(Continued on following page)

TABLE A.4.2.2 (CONTINUED)

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)	(6H)
H-ANXIETY-MOM						
OddsRatio			7.43[a]	4.33[c]	3.76	3.09
MarginalEffect			0.11	0.08	0.07	0.06
StandardError			0.64	0.82	0.83	0.83
ALCOHOL-DAD						
OddsRatio			1.25	1.28	1.16	1.13
MarginalEffect			0.01	0.01	0.01	0.01
StandardError			0.21	0.22	0.22	0.23
ALCOHOL-MOM						
OddsRatio			0.99	0.58	0.54	0.53
MarginalEffect			-0.00	-0.03	-0.03	-0.03
StandardError			0.46	0.55	0.55	0.54
DRUG-DAD						
OddsRatio			5.37[b]	2.18	2.65	2.90
MarginalEffect			0.09	0.04	0.05	0.05
StandardError			0.88	1.78	1.72	1.71
DRUG-MOM						
OddsRatio			1.54	0.42	0.47	0.45
MarginalEffect			0.02	-0.05	-0.04	-0.04
StandardError			5.69	13.1	10.2	11.6
H-DEPRESSION&ANXIETY-MOM						
OddsRatio				23.7	21.9	21.9
MarginalEffect				0.17	0.16	0.15
STANDARDEROR				2.47	2.45	2.45
H-DEPRESSION&ALCOHOL-DAD						
OddsRatio				0.88	0.70	0.50
MarginalEffect				-0.01	-0.02	-0.04
STANDARDEROR				1.75	1.77	1.78
H-DEPRESSION&ALCOHOL-MOM						
OddsRatio				44.9[a]	26.3[a]	20.2[a]
MarginalEffect				0.20	0.17	0.15
STANDARDEROR				1.25	1.24	1.23
ALCOHOL-DRUG						
OddsRatio				3.65	2.50	2.38
MarginalEffect				0.07	0.05	0.04
STANDARDEROR				2.04	1.99	1.97
YOUTH DISORDER						
OddsRatio					2.43[a]	2.37[a]
MarginalEffect					0.05	0.04
STANDARDEROR					0.20	0.20
TEENCHILD						
OddsRatio						3.12[a]
MarginalEffect						0.06
StandardErrror						0.30

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TABLE A.4.2.2 (CONTINUED)

SPECIFICATION	(1)	(2H)	(3H)	(4H)	(5H)	(6H)
-2 LOG L	931.6	931.3	905.1	894.3	874.8	861.5
Chi-square	260.0	260.3	286.6	297.3	316.8	330.2
DF	23	25	31	35	36	37
Likelihood Ratio Tests:		chi-square statistics:			P –value:	
Specification 1 vs. 2		0.3			0.95	
Specification 1 vs. 3		26.2			0.001	
Specification 3 vs. 4		10.8			0.05	
Specification 4 vs. 5		19.5			0.00	
Specification 5 vs. 6.		13.3			0.00	

Marginal effects are partial derivative with respect to the vector of characteristics

Computed at the means of the Xs

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

Due to the high multicollinearity estimation for HANXIETY-ALCOHOL-DAD, HANXIETY&ALCOHOL-MOM, and HADRUG-MOM was not possible..

Not possible.

TABLE A.4.3
WEIGHTED LOGISTIC ANALYSIS OF HIGH SCHOOL DROPOUT
CONTROLLING FOR DIFFERENT TYPES OF YOUTH MENTAL DISORDERS
FOR FEMALES (N = 1757)

	(7I)	(7H)	(8I)	(8H)
INTERCEPT				
OddsRatio				
MarginalEffect	-0.028	-0.024	-0.021	-0.02
StandardError	1.84	1.85		1.84
ANXIETY-YTH				
OddsRatio	1.404	1.461[c]	1.44[c]	1.43
MarginalEffect	0.015	0.016	0.015	0.015
StandardError	0.219	0.219	0.22	0.22
MOOD-YTH				
OddsRatio	1.100	1.124	1.18	1.10
MarginalEffect	0.004	0.005	0.007	0.004
StandardError	0.373	0.376	0.38	0.38
ALCOHOL-YTH				
OddsRatio	2.225[b]	2.238[b]	2.15[b]	2.33[b]
MarginalEffect	0.035	0.034	0.033	0.035
StandardError	0373	0.378	0.38	0.38
DRUG-YTH				
OddsRatio	0.765	0.663	0.75	0.67
MarginalEffect	-0.012	-0.018	-0.012	-0.017
StandardError	0.503	0.514	0.52	0.52
CONDUCT-YTH				
OddsRatio	2.308[b]	2.221[b]	2.37[b]	2.27[b]
MarginalEffect	0.037	0.034	0..037	0.034
StandardError	0.354	0.353	0.36	0.36
DAD-HIST				
OddsRatio	0.948	1.110		
MarginalEffect	-0.002	0.00		
StandardError	0.215	0.221		
MOM-HIST				
OddsRatio	1.372	2.312[a]		
MarginalEffect	0.014	0.04		
StandardError	0.241	0.269		
DEPRESSION-DAD				
OddsRatio			0.397[b]	0.814
MarginalEffect			-0.039	-0.009
StandardError			0.403	0.734
DEPRESSION-MOM				
OddsRatio			1.186	2.690[c]
MarginalEffect			0.007	0.041
StandardError			0.342	0.527
ANXIETY-DAD				
OddsRatio			2.144[C]	4.284[b]
MarginalEffect			0.032	0.060
StandardError			0.398	0.748
ANXIETY-MOM				
OddsRatio			0.830	0.635
MarginalEffect			-0.008	-0.019
StandardError			0.410	0.667
ALCOHOL-DAD				
OddsRatio			1.132	1.020
MarginalEffect			0.005	0.001
StandardError			0.235	0.231
ALCOHOL-MOM				
OddsRatio			2.062[b]	1.935[c]
MarginalEffect			0.031	0.027
StandardError			0.349	0.345

(Continued on following page)

TABLE A.4..3(CONTINUED)

SPECIFICATION	(7I)	(7H)	(8I)	(8H)
DRUG-DAD				
OddsRatio			1.103	0.979
MarginalEffect			0.004	-0.001
StandardError			1.126	1.123
DRUG-MOM				
OddsRatio			1.730	1.200
MarginalEffect			0.023	0.008
StandardError			1.051	1.067
AGE				
OddsRatio	0.832	0.837	0.835	0.843
MarginalEffect	-0.008	-0.008	-0.008	-0.007
StandardError	0.147	0.147	0.147	0.148
AGESQUARE				
OddsRatio	1.003	1.003	1.003	1.003
MarginalEffect	0.000	0.000	0.000	0.000
StandardError	0.002	0.002	0.002	0.002
GOODHEALTH				
OddsRatio	0.466[a]	0.470[a]	0.465[a]	0.490[a]
MarginalEffect	-0.034	-0.032	-0.033	-0.030
StandardError	0.276	0.276	0.279	0.280
BLACK				
OddsRatio	0.162[a]	0.158[a]	0.152[a]	0.143[a]
MarginalEffect	-0.080	-0.079	-0.080	-0.081
StandardError	0.449	0.452	0.451	0.463
HISPANIC				
OddsRatio	1.841	1.846	1.731	1.926
MarginalEffect	0.027	0.026	0.023	0.027
StandardError	0.431	0.428	0.430	0.430
OTHERRACES				
OddsRatio	1.172	1.256	1.155	1.285
MarginalEffect	0.007	0.010	0.006	0.010
StandardError	0.564	0.567	0.572	0.567
PROTESTANT				
OddsRatio	3.041[a]	3.184[a]	3.050[a]	3.214[a]
MarginalEffect	0.049	0.049	0.047	0.049
StandardError	0.284	0.286	0.285	0.287
OTHERRELIGION				
OddsRatio	1.103	1.162	1.015	1.212
MarginalEffect	0.004	0.006	0.001	0.008
StandardError	0.602	0.612	0.609	0.606
NORELIGION				
OddsRatio	2.218[c]	2.345[c]	2.163[c]	2.525[b]
MarginalEffect	0.035	0.036	0.033	0.038
StandardError	0.446	0.450	0.451	0.452
ENGLISH				
OddsRatio	1.353	1.373	1.394	1.349
MarginalEffect	0.013	0.014	0.014	0.012
StandardError	0.348	0.350	0.352	0.350
INTACTFAMILY				
OddsRatio	0.768	0.811	0.801	0.851
MarginalEffect	-0.012	-0.009	-0.009	-0.007
StandardError	0.273	0.275	0.278	0.281
EDUCATION-F-S				
OddsRatio	0.839[a]	0.828[a]	0.827[a]	0.824[a]
MarginalEffect	-0.008	-0.08	-0.008	-0.008
StandardError	0.031	0.031	0.031	0.032
BETTERTHANAVG				
OddsRatio	0.964	1.003	0.996	0.948
MarginalEffect	-0.002	0.000	-0.000	-0.002
StandardError	0.268	0.270	0.273	0.272

(Continued on following page)

TABLE A.4.3 (CONTINUED)

SPECIFICATION	(7I)	(7H)	(8I)	(8H)
WORSETHANAVG				
OddsRatio	0.459[b]	0.414[b]	0.444[b]	0.441[b]
MarginalEffect	-0.034	-0.038	-0.035	-0.034
StandardError	0.362	0.368	0.370	0.367
SIBLINGS				
OddsRatio	1.160[a]	1.163[a]	1.154[a]	1.172[a]
MarginalEffect	0.007	0.006	0.006	0.007
StandardError	0.038	0.038	0.038	0.039
MOVED				
OddsRatio	1.021	1.014	1.015	1.018
MarginalEffect	0.001	0.001	0.001	0.001
StandardError	0.022	0.022	0.022	0.022
RURAL				
OddsRatio	0.513[a]	0.510[a]	0.532[b]	0.503[a]
MarginalEffect	-0.029	-0.029	-0.027	-0.029
StandardError	0.266	0.268	0.269	0.270
NORTHEAST				
OddsRatio	1.009	1.006	0.998	0.997
MarginalEffect	0.000	0.000	-0.000	-0.000
StandardError	0.300	0.302	0.303	0.303
MIDWEST				
OddsRatio	1.461	1.439	1.438	1.416
MarginalEffect	0.017	0.016	0.015	0.014
StandardError	0.250	0.251	0.252	0.254
WEST				
OddsRatio	0.680	0.666	0.632	0.655
MarginalEffect	-0.017	-0.017	-0.019	-0.018
StandardError	0.331	0.331	0.337	0.335
MAXUNEMPLOYMENT				
OddsRatio	1.019	1.011	1.019	1.015
MarginalEffect	0.001	0.000	0.001	0.001
StandardError	0.104	0.106	0.105	0.106
MINUNEMPLOYMENT				
OddsRatio	1.139	1.134	1.132	1.119
MarginalEffect	0.006	0.005	0.005	0.005
StandardError	0.144	0.145	0.144	0.145
VIETNAMWAR				
OddsRatio	0.840	0.791	0.770	0.749
MarginalEffect	-0.008	-0.010	-0.011	-0.012
StandardError	0.371	0.373	0.375	0.375

SPECIFICATION	(2I)	(2H)	(7I)	(7H)	(3I)	(3H)	(8I)	(8H)
-2 LOG L	786.2	778.1	772.7	764.7	777	773.6	763.2	760.1
Chi-square	181.5	189.6	195	203	190.8	194.2	204.6	207.7
DF	25	25	30	30	31	31	36	36

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification I7 Vs. I1	13.5	0.025
Specification H7 Vs. H1	13.4	0.025
Specification I8 vs. I_2	13.8	0.025
Specification H8 vs. H_2	13.5	0.025

INCLUDING SPECIFICATION 2I IN 7I AND SPECIFICATION 2H IN 7H AND

INCLUDING SPECIFIATION 3I IN 8I AND SPECIFICATION 3H IN 8H

[1] Specification 2I is specification 1 from Table 6.1 and 6.H

TABLE A.4.4
WEIGHTED LOGISTICE ANALYSIS OF HIGH SCHOOL DROPOUT
CONTROLLING FOR DIFFERENT TYPES OF YOUTH MENTAL DISORDER
FOR MALES (N= 1632)

	(7I)	(7H)	(8I)	(8H)
INTERCEPT				
OddsRatio	1.78	0.10	0.10	0.12
MarginalEffect	0.11	1.79	1.81	1.82
StandardError				
ANXIETY				
OddsRatio	1.515[c]	1.52[c]	1.497	1.490
MarginalEffect	0.023	0.023	0.021	0.021
StandardError	0.252	0.251	0.256	0.258
MOOD				
OddsRatio	1.00	1.00	0.777	0.895
MarginalEffect	0.000	0.000	-0.013	-0.006
StandardError	0.439	0.438	0.488	0.475
ALCOHOL				
OddsRatio	1.608[b]	1.62[b]	1.553[c]	1.598[c]
MarginalEffect	0.026	0.026	0.023	0.024
StandardError	0.246	0.247	0.252	0.251
DRUG				
OddsRatio	1.156	1.156	1.181	1.043
MarginalEffect	0.008	0.010	0.009	0.002
StandardError	0.334	0.334	0.342	0.342
CONDUCT				
OddsRatio	2.756[a]	2.76[a]	2.86[a]	2.740[a]
MarginalEffect	0.055	0.06	0.054	0.052
StandardError	0.224	0.224	0.228	0.230
DADDISORDER				
OddsRatio	1.036	0.963		
MarginalEffect	0.002	-0.002		
StandardError	0.206	0.214		
MOMDISORDER				
OddsRatio	0.918	0.926		
MarginalEffect	-0.005	-0.004		
StandardError	0.257	0.321		
DEPRESSION-DAD				
OddsRatio			0.869	1.361
MarginalEffect			-0.007	0.016
StandardError			0.424	0.993
DEPRESSION-MOM				
OddsRatio			0.648	0.289[c]
MarginalEffect			-0.022	-0.064
StandardError			0.392	0.682
ANXIETY-DAD				
OddsRatio			0.331[b]	0.076[b]
MarginalEffect			-0.057	-0.133
StandardError			0.517	1.251
ANXIETY-MOM				
OddsRatio			2.498	6.839[a]
MarginalEffect			0.047	0.099
StandardError			0.439	0.645
ALCOHOL-DAD				
OddsRatio			1.200	1.112
MarginalEffect			0.009	0.005
StandardError			0.225	0.220
ALCOHOL-MOM				
OddsRatio			0.823	0.857
MarginalEffect			-0.010	-0.008
StandardError			0.447	0.458

(Continued on following page)

TABLE A.4.4 (CONTINUED)

SPECIFICATION	(7I2)	(7H)	(8I)	(8H)
DRUG-DAD				
OddsRatio			4.396	4.370
MarginalEffect			0.077	0.076
StandardError			0.916	0.918
DRUG-MOM				
OddsRatio			0.826	0.706
MarginalEffect			-0.010	-0.018
StandardError			4.910	4.647
AGE				
OddsRatio	0.927	0.929	0.947	0.949
MarginalEffect	-0.004	-0.004	-0.003	-0.003
StandardError	0.092	0.092	0.093	0.094
AGESQUARE				
OddsRatio	1.001	1.001	1.001	1.001
MarginalEffect	0.000	0.000	0.00	0.000
StandardError	0.001	0.001	0.222	0.001
GOODHEALTH				
OddsRatio	0.462[a]	0.465[a]	0.403[a]	0.402[a]
MarginalEffect	-0.042	-0.042	-0.047	-0.047
StandardError	0.289	0.286	0.297	0.294
BLACK				
OddsRatio	1.419	1.426	1.449	1.425
MarginalEffect	0.019	0.019	0.019	0.018
StandardError	0.318	0.318	0.323	0.323
HISPANIC				
OddsRatio	1.464	1.470	1.459	1.494
MarginalEffect	0.021	0.021	0.020	0.021
StandardError	0.310	0.320	0.327	0.331
OTHERRACES				
OddsRatio	0.258[b]	0.257[b]	0.281[b]	0.291[b]
MarginalEffect	-0.074	-0.074	-0.066	-0.064
StandardError	0.609	0.608	0.608	0.612
PROTESTANT				
OddsRatio	0.668[c]	0.672[c]	0.643	0.703
MarginalEffect	-0.022	-0.022	-0.023	-0.018
StandardError	0.229	0.230	0.234	0.235
OTHERRELIGION				
OddsRatio	0.455[c]	0.451[c]	0.428[c]	0.502
MarginalEffect	-0.043	-0.043	-0.044	-0.036
StandardError	0.471	0.471	0.473	0.470
NORELIGION				
OddsRatio	0.818	0.821	0.707	0.797
MarginalEffect	-0.011	-0.011	-0.018	-0.012
StandardError	0.349	0.351	0.355	0.353
ENGLISH				
OddsRatio	1.110	1.113	1.069	1.051
MarginalEffect	0.006	0.006	0.003	0.003
StandardError	0.280	0.107	0.289	0.293
INTACTFAMILY				
OddsRatio	0.897	0.890	0.910	0.890
MarginalEffect	-0.006	-0.006	-0.005	-0.006
StandardError	0.252	0.253	0.266	0.266
EDUCATION-F-S				
OddsRatio	0.787[a]	0.787[a]	0.783[a]	0.781[a]
MarginalEffect	-0.013	-0.013	-0.013	-0.013
StandardError	0.027	0.027	0.028	0.028
BETTERTHANAVG				
OddsRatio	1.048	1.032	1.065	1.059
MarginalEffect	0.003	0.002	0.003	0.003
StandardError	0.246	0.244	0.249	0.248

(Continued on following page)

TABLE A. 4.4 (CONTINUED)

SPECIFICATION	(7I)	(7H)	(8I)	(8H)
WORSETHANAVG				
OddsRatio	0.683	0.685	0.643	0.586[c]
MarginalEffect	-0.02	-0.021	-0.023	-0.028
StandardError	0.294	0.293	0.302	0.306
SIBLINGS				
OddsRatio	1.134[a]	1.135[a]	1.132[a]	1.139[a]
MarginalEffect	0.007	0.007	0.001	0.007
StandardError	0.035	0.035	0.036	0.036
MOVED				
OddsRatio	1.060[b]	1.060[b]	1.071[b]	1.063[b]
MarginalEffect	0.003	0.003	0.004	0.003
StandardError	0.029	0.029	0.029	0.029
RURAL				
OddsRatio	1.138	1.138	1.105	1.146
MarginalEffect	0.007	0.007	0.005	0.007
StandardError	0.217	0.217	0.218	0.220
NORTHEAST				
OddsRatio	0.653	0.656	0.638	0.669
MarginalEffect	-0.023	-0.023	-0.023	-0.021
StandardError	0.277	0.276	0.280	0.280
MIDWEST				
OddsRatio	0.616[b]	0.620[c]	0.634[c]	0.605[b]
MarginalEffect	-0.026	-0.026	-0.024	-0.026
StandardError	0.252	0.252	0.252	0.256
WEST				
OddsRatio	0.633[c]	0.635	0.654	0.668
MarginalEffect	-0.025	-0.025	-0.022	-0.021
StandardError	0.281	0.281	0.285	0.288
MAXUNEMPLOYMENT				
OddsRatio	0.847[b]	0.847[b]	0.849[b]	0.848[b]
MarginalEffect	-0.009	-0.009	-0.008	-0.009
StandardError	0.081	0.080	0.082	0.052
MINUNEMPLOYMENT				
OddsRatio	1.226[b]	1.226[b]	1.214[c]	1.192[c]
MarginalEffect	0.011	0.011	0.010	0.009
StandardError	0.103	0.103	0.104	0.103
VIETNAMWAR				
OddsRatio	0.651	0.652	0.617	0.592
MarginalEffect	-0.023	-0.023	-0.025	-0.027
StandardError	0.345	0.345	0.348	0.350

SPECIFICATION	I1	H1	I7	H7	I8	H8
-2 LOG L	930.8	931.3	894.8	894.8	879.7	873.2
Chi-square	260.8	260.3	296.8	296.8	311.9	318.4
DF	25	25	30	30	36	36

Likelihood Ratio Tests:	chi-square statistics:	P –value:
Specification I7 Vs. 2I	36.0	0.000
Specification H7 Vs. 2H	36.5	0.000
Specification I8 vs. 7I	13.6	0.25
Specification H8 vs. H7	13.5	0..25

Including Specification I_1 in I7 and Specification H_1 in H_7 and Including Specification I_2 in I_8 and Specification H_2 in H_8.

TABLE A.4.5
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
CONTROLLING FOR LIFETIME MENTAL DISORDERS
FOR FEMALES (N = 1367) AND MALES (N=1206)

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(9)	(9)
MOOD-LIFE		
MarginalEffect	-0.02	-0.01
OddsRatio	0.82	0.69
Standard Error	0.21	0.45
ANXIETY-LIFE		
MarginalEffect	-0.07[a]	0.01
OddsRatio	0.51	0.78
Standard Error	0.18	0.39
ALCOHOL-LIFE		
MarginalEffect	0.04	-0.01
OddsRatio	1.49	0.61
Standard Error	0.26	0.36
DRUG-LIFE		
MarginalEffect	-0.07[b]	.01
OddsRatio	0.52	1.97
Standard Error	0.31	0.51
AGE		
MarginalEffect	0.03[a]	-0.00
OddsRatio	1.28	0.98
Standard Error	0.07	0.15
AGE2		
MarginalEffect	-0.00[a]	0.00
OddsRatio	1.00	1.00
StandardError	0.00	0.00
GOOD HEALTH		
MarginalEffect	0.06[b]	0.01
OddsRatio	1.88	1.54
StandardError	0.27	0.51
BLACK		
MarginalEffect	-0.02	-0.02[a]
OddsRatio	0.81	0.32
StandardError	0.30	0.47
HISPANIC		
MarginalEffect	-0.04	-0.02[a]
OddsRatio	0.66	0.30
StandardError	0.38	0.47
OTHRACE		
MarginalEffect	-0.01	-0.03[a]
OddsRatio	0.87	0.22
StandardError	0.51	0.60
PROTESTANT		
MarginalEffect	-0.05[b]	-0.01
OddsRatio	0.60	0.70
StandardError	0.22	0.44
OTHERRELIGION		
MarginalEffect	-0.07[b]	-0.04[a]
OddsRatio	0.51	0.17
StandardError	0.37	0.60

(Continued on following page)

TABLE A.4.5 (CONTINUED)

VARIABLE	FEMALES	MALES
NO RELIGION		
MarginalEffect	-0.07[b]	-0.00
OddsRatio	0.48	0.78
StandardError	0.35	0.62
ENGLISH		
MarginalEffect	-0.02	-0.00
OddsRatio	0.82	0.92
StandardError	0.32	0.47
INTACT FAMILY		
MarginalEffect	-0.02	-0.00
OddsRatio	0.86	0.94
StandardError	0.24	0.42
PARENT-EDUCATION		
MarginalEffect	-0.00	-0.00
OddsRatio	0.97	0.99
StandardError	0.03	0.05
SIBLINGS		
MarginalEffect	-0.00	0.00
OddsRatio	0.96	1.09
StandardError	0.03	0.06
MOVED		
MarginalEffect	-0.00	-0.00
OddsRatio	0.96	1.00
StandardError	0.02	0.04
RURAL		
MarginalEffect	-0.00	-0.01[b]
OddsRatio	0.98	0.55
StandardError	0.23	0.34
NORTHEAST		
MarginalEffect	0.01	0.01
OddsRatio	1.05	1.54
StandardError	0.25	0.50
MIDWEST		
MarginalEffect	-0.04[c]	0.01
OddsRatio	0.67	1.64
StandardError	0.22	0.46
WEST		
MarginalEffect	-0.00	-0.01
OddsRatio	0.99	0.72
StandardError	0.26	0.42
MARRIED		
MarginalEffect	0.01	0.00
OddsRatio	1.07	1.28
StandardError	0.24	0.41
HOUSEHOLD#		
MarginalEffect	-0.02[a]	-0.00[a]
OddsRatio	0.81	0.78
StandardError	0.06	0.08
DROPOUT		
MarginalEffect	-0.11[a]	-0.03[a]
OddsRatio	0.33	0.27
StandardError	0.26	0.42
SOMECOLG		
MarginalEffect	0.07[a]	-0.01
OddsRatio	1.93	0.57
StandardError	0.23	0.39
COLLGE		
MarginalEffect	0.08[a]	0.02
OddsRatio	2.14	2.18
StandardError	0.29	0.66

(Continued on following page)

TABLE A.4.5 (CONTINUED)

VARIABLE	FEMALES	MALES
COLGPLUS		
MarginalEffect	0.18[a]	0.03
OddsRatio	6.27	4.93
StandardError	0.47	1.09
SPOUSEINCOME		
MarginalEffect	-0.00[a]	-0.00
OddsRatio	1.00	1.00
StandardError	1.00	1.00
ASSETS		
MarginalEffect	0.00	-0.00
OddsRatio	1.00	1.00
StandardError	1.00	1.00

SPECIFICATIONS	FEMALES	MALES
# OF OBSERVATIONS	1367	1175
-2 LOG L	980.8	384.5
DF	30	30
chi-square	220.2	97.3

* indicates statistical significance at $\alpha \leq .10$; ** at $\alpha \leq .05$; *** at $\alpha \leq .01$

TABLE A.4.6
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
INSTRUMENTING LIFETIME MENTAL DISORDERS
FOR FEMALES (N=1367)

VARIABLES	10I	10H	11 I	11H
INTERCEPT				
MARGINALEFFCET	-0.02	-0.03	-0.07	-0.08
ODDSRATIO	.	.	.	.
STANDARDERROR	1.30	1.29	1.28	1.27
MOODLIFHAT				
MARGINALEFFCET	-0.24[C]	-0.13	-0.09	0.09
ODDSRATIO	0.10	0.28	0.41	2.36
STANDARDERROR	-2.35	1.61	0.82	1.31
ANXIETYLIFHAT				
MARGINALEFFCET	-0.07	-0.07	-0.05	-0.10[c]
ODDSRATIO	0.50	0.51	0.60	0.38
STANDARDERROR	-0.69	0.56	0.51	0.52
ALCOHOLLIFHAT				
MARGINALEFFCET	0.12	-0.02	-0.01	-0.13
ODDSRATIO	3.45	0.81	0.93	0.27
STANDARDERROR	1.24	1.76	1.03	1.29
DRUGLIFHAT				
MARGINALEFFCET	0.01	0.07	-0.05	0.06
ODDSRATIO	1.10	2.04	0.62	1.78
STANDARDERROR	0.10	1.55	1.10	1.23
SPOUSEINCOME				
MARGINALEFFECT	-0.00[a]	-0.00[a]	-0.00[a]	-0.00[a]
ODDSRATIO	1.00	1.00	1.00	1.00
STANDARDERROR	0.00	0.00	0.00	0.00
ASSET				
MARGINALEFFECT	0.00	0.00	0.00	0.00
ODDSRATIO	1.00	1.00	1.00	1.00
STANDARDERROR	0.00	0.00	0.00	0.00
AGE				
MARGINALEFFECT	0.02[a]	0.02[a]	0.03[a]	0.03[a]
ODDSRATIO	1.27	1.28	1.30	1.29
STANDARDERROR	0.07	0.07	0.07	0.07
AGE2				
MARGINALEFFECT	-0.00[a]	-0.00[a]	-0.00[a]	-0.00[a]
ODDSRATIO	1.00	1.00	1.00	1.00
STANDARDERROR	0.00	0.00	0.00	0.00
GOODHEALTH				
MARGINALEFFECT	0.01	0.04	0.05	0.09[b]
ODDSRATIO	1.13	1.46	1.65	2.40
STANDARDERROR	0.40	0.45	0.33	0.39
BLACK				
MARGINALEFFECT	-0.01	-0.03	-0.03	-0.04
ODDSRATIO	0.88	0.77	0.76	0.70
STANDARDERROR	0.35	0.33	0.32	0.32
HISPANIC				
MARGINALEFFECT	-0.05	-0.05	-0.04	-0.04
ODDSRATIO	0.61	0.64	0.65	0.67
STANDARDERROR	0.38	0.38	0.37	0.37
OTHER RACES				
MARGINALEFFECT	-0.02	-0.03	-0.03	-0.02
ODDSRATIO	0.78	0.78	0.78	0.79
STANDARDERROR	0.50	0.50	0.50	0.50

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TABLE A.4.6 (CONTINUED)

VARIABLE	FEMALES		MALES	
PROTESTANT				
MARGINALEFFECT	-0.05[a]	-0.05[b]	-0.05[b]	-0.05[b]
ODDSRATIO	0.58	0.60	0.60	0.62
STANDARDERROR	0.22	0.22	0.22	0.22
OTHERELIG				
MARGINALEFFECT	-0.07[c]	-0.08[c]	-0.06	-0.08[b]
ODDSRATIO	0.48	0.46	0.55	0.47
STANDARDERROR	0.41	0.41	0.40	0.40
NO RELIGION				
MARGINALEFFECT	-0.05	-0.06	-0.05	-0.08[b]
ODDSRATIO	0.60	0.56	0.58	0.46
STANDARDERROR	0.38	0.41	0.38	0.39
ENGLISH				
MARGINALEFFECT	-0.00	-0.01	-0.02	-0.02
ODDSRATIO	0.97	0.89	0.81	0.79
STANDARDERROR	0.35	0.34	0.33	0.33
INTACT FAMILY				
MARGINALEFFECT	0.00	-0.01	-0.01	-0.03
ODDSRATIO	1.05	0.90	0.87	0.73
STANDARDERROR	0.29	0.30	0.25	0.27
PARENT-EDUCATION				
MARGINALEFFECT	-0.00	-0.00	-0.00	-0.00
ODDSRATIO	0.97	0.97	0.97	0.97
STANDARDERROR	0.03	0.03	0.03	0.03
SIBLIINGS				
MARGINALEFFECT	-0.00	-0.00	-0.00	-0.00
ODDSRATIO	0.97	0.97	0.97	0.96
STANDARDERROR	0.04	0.04	0.04	0.04
MOVED				
MARGINALEFFECT	-0.00[c]	-0.01[c]	-0.00	-0.00[c]
ODDSRATIO	0.96	0.95	0.96	0.96
STANDARDERROR	0.03	0.03	0.03	0.03
RURAL				
MARGINALEFFECT	-0.01	-0.01	-0.01	-0.01
ODDSRATIO	0.92	0.91	0.94	0.94
STANDARDERROR	0.23	0.23	0.23	0.23
NEAST				
MARGINALEFFECT	-0.00	0.01	0.01	0.01
ODDSRATIO	1.00	1.05	1.09	1.11
STANDARDERROR	0.26	0.26	0.25	0.25
MIDWEST				
MARGINALEFFECT	-0.03	-0.03	-0.03	-0.03
ODDSRATIO	0.74	0.76	0.72	0.71
STANDARDERROR	0.24	0.24	0.23	0.23
WEST				
MARGINALEFFECT	0.00	0.01	0.01	0.00
ODDSRATIO	1.01	1.07	1.07	1.05
STANDARDERROR	0.27	0.27	0.27	0.26
MARRIED				
MARGINALEFFECT	0.01	0.01	0.01	0.00
ODDSRATIO	1.06	1.06	1.07	1.05
STANDARDERROR	0.24	0.24	0.24	0.24
HOUSEHOLD#				
MARGINALEFFECT	-0.02[a]	-0.02[a]	-0.02[a]	-0.02[a]
ODDSRATIO	0.79	0.79	0.79	0.79
STANDARDERROR	0.06	0.06	0.06	0.06
DROPOUT				
MARGINALEFFECT	-1.00[a]	-0.10[a]	-0.10[a]	-0.10[a]
ODDSRATIO	0.38	0.38	0.38	0.39
STANDARDERROR	0.26	0.26	0.26	0.26

(Continued on following page)

TABLE A.4.6 (CONTINUED)

VARIABLE	FEMALES		MALES	
SOMECOLG				
MARGINALEFFECT	0.07[a]	0.07[a]	0.07[a]	0.07[a]
ODDSRATIO	2.05	2.04	2.03	2.01
STANDARDERROR	0.23	0.23	0.23	0.23
COLLEGE				
MARGINALEFFECT	0.08[a]	008[a]	0.08[a]	0.08[a]
ODDSRATIO	2.18	2.21	2.28	2.25
STANDARDERROR	0.29	0.29	0.29	0.29
COLEGPLUS				
MARGINALEFFECT	0.19[a]	0.19[a]	0.19[a]	0.19[a]
ODDSRATIO	6.32	6.35	6.34	6.26
STANDARDERROR	0.46	0.46	0.46	0.46

SPECIFICATIONS	(10I)	(10H)	(11)	(11H)
# OF OBSERVATIONS	1367	1367	1367	1367
-2 LOG L	983.5	987.1	986.6	990.3
DF	30	30	30	30
chi-square	217.5	213.9	214.4	210.7

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

Constructing the instrumental variables by using parental mental disorders interferes with life and hospitalization and youth mental Disorders and Other Control

variables as identifying variables.

TABLE A.4.7
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
INSTRUMENTING LIFETIME MENTAL DISORDERS
FOR MALES (N=1206)

VARIABLES	10I	10H	11 I	11H
OOD-LIFEHAT				
MarginalEffect	-0.050	-0.062	-0.051	-0.041
OddsRatio	0.083	0.043	0.079	0.122
StandardError	2.196	2.324	2.062	2.135
ANXIETY-LIFEHAT				
MarginalEffect	-0.021	-0.054	-0.013	-0.086[c]
OddsRatio	0.360	0.065	0.519	0.013
StandardError	2.281	2.436	1.904	2.363
ALCOHOL-LIFEHAT				
MarginalEffect	0.002	0.038	0.003	0.063[c]
OddsRatio	1.094	6.806	1.134	25.13
StandardError	1.551	2.066	1.331	1.81
DRUG-LIFEHAT				
MarginalEffect	0.054	0.036	0.043	0.021
OddsRatio	14.52	6.001	8.553	2.985
StandardError	2.136	2.255	1.994	1.74
SPOUSEINCOME				
MarginalEffect	-0.000	-0.000	-0.000	-0.000
OddsRatio	1.000	1.000	1.000	1.000
StandardError	0.000	0.000	0.000	0.000
ASSET				
MarginalEffect	-0.000	-0.000	-0.000	-0.000
OddsRatio	1.000	1.000	1.000	1.000
StandardError	0.000	0.000	0.000	0.000
AGE				
MarginalEffect	-0.002	-0.002	-0.002	-0.001
OddsRatio	0.906	0.925	0.923	0.960
StandardError	0.169	0.168	0.164	0.157
AGESQUARE				
MarginalEffect	0.000	0.000	0.000	0.000
OddsRatio	1.002	1.001	1.001	1.001
StandardError	0.002	0.002	0.002	0.002
GOODHEALTH				
MarginalEffect	0.004	0.003	0.003	0.003
OddsRatio	1.217	1.150	1.181	1.183
StandardError	0.536	0.547	0.539	0.554
BLACK				
MarginalEffect	-0.022[b]	-0.019[c]	-0.022[b]	-0.0156
OddsRatio	0.334	0.376	0.329	0.449
StandardError	0.536	0.536	0.516	0.516
HISPANIC				
MarginalEffect	-0.024[b]	-0.029[a]	-0.024[b]	-0.032[a]
OddsRatio	0.301	0.236	0.297	0.199
StandardError	0.512	0.541	0.507	0.527
OTHERRACES				
MarginalEffect	-0.031[a]	-0.030[a]	-0.031[a]	-0.028[b]
OddsRatio	0.217	0.218	0.211	0.238
StandardError	0.636	0.634	0.633	0.636
PROTESTANT				
MarginalEffect	-0.005	-0.003	-0.006	-0.003
OddsRatio	0.769	0.859	0.745	0.843
StandardError	0.455	0.469	0.449	0.470

(Continued on following page)

TABLE A.4.7 (CONTINUED)

VARIABLE	FEMALES		MALES	
OTHERRELIGION				
MarginalEffect	-0.037[a]	-0.037[a]	-0.036[a]	-0.041[a]
OddsRatio	0.161	0.152	0.170	0.125
StandardError	0.692	0.688	0.675	0.681
NORELIGION				
MarginalEffect	-0.005	-0.005	-0.005	-0.007
OddsRatio	0.786	0.765	0.770	0.702
StandardError	0.638	0.637	0.636	0.638
ENGLISH				
MarginalEffect	0.004	0.009	0.004	0.010
OddsRatio	1.225	1.597	1.196	1.638
StandardError	0.514	0.561	0.500	0.539
INTACTFAMILY				
MarginalEffect	-0.004	-0.008	-0.004	-0.009
OddsRatio	0.802	0.672	0.824	0.620
StandardError	0.453	0.477	0.447	0.472
EDUCATION-F-S				
MarginalEffect	-0.001	-0.001	-0.000	-0.001
OddsRatio	0.974	0.954	0.977	0.936
StandardError	0.053	0.054	0.052	0.055
SIBLINGS				
MarginalEffect	0.002	0.001	0.002	0.001
OddsRatio	1.093	1.062	1.091	1.030
StandardError	0.072	0.075	0.070	0.072
MOVED				
MarginalEffect	0.001	0.001	0.001	0.001
OddsRatio	1.030	1.058	1.028	1.056
StandardError	0.047	0.055	0.046	0.055
RURAL				
MarginalEffect	-0.013[c]	-0.013	-0.013[c]	-0.013[c]
OddsRatio	0.536	0.516	0.530	0.524
StandardError	0.344	0.347	0.343	0.348
NORTHEAST				
MarginalEffect	0.009	0.011	0.009	0.012
OddsRatio	1.597	1.755	1.540	1.888
StandardError	0.515	0.517	0.510	0.518
MIDWEST				
MarginalEffect	0.011	0.011	0.010	0.010
OddsRatio	1.718	1.705	1.655	1.699
StandardError	0.469	0.467	0.469	0.464
WEST				
MarginalEffect	-0.009	-0.010	-0.009	-0.012
OddsRatio	0.648	0.607	0.651	0.542
StandardError	0.457	0.458	0.451	0.454
MARRIED				
MarginalEffect	0.007	0.008	0.007	0.007
OddsRatio	1.427	1.460	1.451	1.451
StandardError	0.417	0.418	0.418	0.416
#households				
MarginalEffect	-0.005[a]	-0.005[a]	-0.005[a]	-0.005[a]
OddsRatio	0.792	0.791	0.792	0.791
StandardError	0.078	0.078	0.078	0.079
Dropout				
MarginalEffect	-0.027[a]	-0.027[a]	-0.027[a]	-0.027[a]
OddsRatio	0.257	0.260	0.255	0.257
StandardError	0.426	0.427	0.427	0.430
Somecollge				
MarginalEffect	-0.009	-0.009	-0.009	-0.008
OddsRatio	0.632	0.641	0.631	0.667
StandardError	0.390	0.390	0.389	0.393

(Continued on following page)

TABLE A.4.7 (CONTINUED)

VARIABLE	FEMALES		MALES	
College				
MarginalEffect	0.018	0.018	0.018	0.018
OddsRatio	2.433	2.491	2.453	2.573
StandardError	0.664	0.665	0.664	0.667
Collgplus				
MarginalEffect	0.036[c]	0.036	0.036[c]	0.037[c]
OddsRatio	6.120	6.006	6.038	6.733
StandardError	1.095	1.095	1.094	1.102
SPECIFICATIONS	(10I)	(10H)	(11I)	(11H)
# OF OBSERVATIONS	1206	1206	1367	1367
-2 LOG L	385.8	384.3	386.1	383.2
DF	30	30	30	30
chi-square	96.0	97.5	95.7	98.6

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

Constructing the instrumental variable by using parental mental disorders interferes with life and in case of hospitalization and

Youth mental disorders and other control variables as identifying variables.

TABLE A.4.8
OLS ESTIMATION OF ANNUAL INCOME
CONTROLLING FOR LIFETIME MENTAL DISORDERS
FOR FEMALES (N=1367) AND MALES (N=1206)

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(9)	(9)
MOOD-LIFE		
Parameter Estimate	-316.0	-225.9
Standard Error	1043.2	1887.1
ANXIETY-LIFE		
Parameter Estimate	-1383.1	1166.9
Standard Error	946.7	1547.5
ALCOHOL-LIFE		
Parameter Estimate	1779.4	738.0
Standard Error	1214.6	1363.7
DRUG-LIFE		
Parameter Estimate	-1299.2	-683.5
Standard Error	1709.8	1859.2
AGE		
Parameter Estimate	2293.7[a]	2780.3[a]
Standard Error	355.9	535.6
AGE2		
Parameter Estimate	-27.03[a]	-28.1[a]
Standard Error	4.86	7.418
GOOD HEALTH		
Parameter Estimate	1931.0	4473.9[c]
Standard Error	1744.2	2355.9
BLACK		
Parameter Estimate	-86.3	-2717.4
Standard Error	1428.5	2165.8
HISPANIC		
Parameter Estimate	3082.8	-6237.7[a]
Standard Error	2145.7	2342.4
OTHRACE		
Parameter Estimate	2419.4	-2390.8
Standard Error	2484.2	3770.2
PROTESTANT		
Parameter Estimate	1152.5	-3742.0[a]
Standard Error	991.2	1419.0
OTHERRELIGION		
Parameter Estimate	3724.4[b]	-3098.0
Standard Error	1798.2	3243.5
NO RELIGION		
Parameter Estimate	-28.93	-1804.2
Standard Error	1886.0	2165.6
ENGLISH		
Parameter Estimate	4669.9[a]	-221.8
Standard Error	1524.4	2067.5
INTACT FAMILY		
Parameter Estimate	-1314.2	1098.9
Standard Error	1195.5	1683.2
PARENT-EDUCATION		
Parameter Estimate	137.5	551.5[a]
Standard Error	133.8	191.6

(Continued on following page)

TABLE A.4.8 (CONTINUED)

VARIABLE	FEMALES	MALES
SIBLINGS		
Parameter Estimate	-300.1[b]	-157.8
Standard Error	176.6	258.8
MOVED		
Parameter Estimate	-77.8	-282.8
Standard Error	166.3	199.2
RURAL		
Parameter Estimate	1062.5	2187.9
Standard Error	1099.6	1375.3
NORTHEAST		
Parameter Estimate	3125.0[a]	-1018.3
Standard Error	1149.5	1637.1
MIDWEST		
Parameter Estimate	-1481.2	-2893.1[b]
Standard Error	1086.5	1481.0
WEST		
Parameter Estimate	2758.7[b]	-2738.4
Standard Error	1221.1	1716.9
MARRIED		
Parameter Estimate	-8932.4[a]	1688.8
Standard Error	1149.4	1591.1
HOUSEHOLD#		
Parameter Estimate	-1963.0[a]	-224.6
Standard Error	334.5	377.4
DROPOUT		
Parameter Estimate	3818.9[b]	-694.7
Standard Error	1982.1	2226.1
SOMECOLG		
Parameter Estimate	3616.6[a]	3425.9[b]
Standard Error	1050.0	1514.0
COLLGE9492.7[a]		
Standard Error	1265.6	1678.0
COLGPLUS		
Parameter Estimate	12161[a]	14159[a]
Standard Error	1373.6	1943.5
SPOUSEINCOME		
Parameter Estimate	0.12[a]	0.051
Standard Error	0.02	0.05
ASSETS		
Parameter Estimate	0.00[a]	0.005
Standard Error	0.00	0.00
F VALUE	21.0[a]	20.9[a]
ADJ R-SQ	0.38	0.36
# of Observation	1417	1206
DF	30	30

Marginal effects are partial derivative with respect to the vector of characteristics computed at the means of the Xs

* indicates statistical significance at $\alpha \leq .10$; ** at $\alpha \leq .05$; *** at $\alpha \leq .01$

TABLE A.4.9
TOBIT ESTIMATION OF ANNUAL INCOME
INSTRUMENTING LIFETIME MENTAL DISORDERS
FOR FEMALES (N=1367)

VAIRABLE	(10I)	(10H)	(11I)	(11H)
MOOD-LIFEHAT				
ParameterEstimate	-12014.8c	-8477.0	39456	3740.8
StandardError	7074.02	9036.9	4714	7276.6
ANXIETY-LIFEHAT				
ParameterEstimate	-12362.5[a]	10352.6[a]	-11551[a]	-10677[a]
StandardError	2951.0	3229.4	2945	3038.4
ALCOHOL-LIFEHAT				
ParameterEstimate	40030.5[a]	31340.2[a]	20781[a]	16429.3[b]
StandardError	10621.1	10157.2	6182	7448.2
DRUG-LIFEHAT				
ParameterEstimate	-19224.9[b]	-18185.2[b]	-14833[b]	-9772.6
StandardError	8464.9	8709.9	6302	6927.2
SPOUSEINCOME				
ParameterEstimate	-0.0296	-0.0301	-0.0309	-0.0312
StandardError	0.024	0.0237	0.0237	0.024
ASSET				
ParameterEstimate	0.0021	0.0022[a]	0.0023	0.0023[a]
StandardError	0.000	0.0004	0.000	0.004
AGE				
ParameterEstimate	2911.5	2919.5[a]	2966[a]	2933.2[a]
StandardError	384.4	384.6	384.2	384.9
AGESQUARE				
ParameterEstimate	-33.45	-34.05[a]	-35.36[a]	-34.91[a]
StandardError	5.315	5.318	5.301	5.307
GOODHEALTH				
ParameterEstimate	1182.11	2275.5	5033.0[a]	5112.9[b]
StandardError	2373.1	2595.8	2002.2	2308.2
BLACK				
ParameterEstimate	1854.0	1208.4	392.87	185.8
StandardError	1706.0	1692.1	1606.8	1627.4
HISPANIC				
ParameterEstimate	-208.04	-108.01	113.18	26.83
StandardError	2179.5	2184.4	2180.5	2187.0
OTHERRACES				
ParameterEstimate	775.2	816.5	769.0	740.12
StandardError	2642.8	2645.5	2642.3	2648.8
PROTESTANT				
ParameterEstimate	-901.2	-821.06	-627.4	-652.9
StandardError	1060.5	1065.1	1056.0	1063.6
OTHERRELIGION				
ParameterEstimate	24.05	342.5	61.85	-344.6
StandardError	2035.8	2078.9	1994.3	2021.8
NORELIGION				
ParameterEstimate	-2127.0	-1893.5	-3092.2	-3040.0
StandardError	2091.3	2223.5	2075.5	2179.9
ENGLISH				
ParameterEstimate	6448.5	5738.7[a]	5200.4[a]	5163.3[a]
StandardError	1739.8	1720.8	1696.5	1693.0
INTACTFAMILY				
ParameterEstimate	-824.9	-1395.0	-2632.3[b]	-2787.4[b]
StandardError	1497.4	1555.6	1345.6	1439.1
EDUCATION-F-S				
ParameterEstimate	-117.13	-64.624	-35.91	-12.23
StandardError	154.4	152.85	151.4	151.0
SIBLINGS				
ParameterEstimate	-562.4	-525.79[a]	-521.4[a]	-505.9[a]

StandardError	188.3	187.86	187.3	187.5

(Continued on following page)

TABLE A.4.9 (CONTINUED)

VARIABLE	FEMALES		MALES	
MOVED				
ParameterEstimate	-379.7	-372.84[b]	-387.2[b]	-418.2[a]
StandardError	163.5	163.90	159.7	159.4
RURAL				
ParameterEstimate	356.4	326.38	423.2	348.2
StandardError	1196.7	1196.4	1193.9	1196.8
NORTHEAST				
ParameterEstimate	844.2	1246.3	1519.2	1553.7
StandardError	1283.4	1273.4	1264.6	1264.8
MIDWEST				
ParameterEstimate	-6045.6	-5732.5[a]	-5952.7[a]	-5637.0[a]
StandardError	1260.7	1248.8	1235.6	1242.5
WEST				
ParameterEstimate	0.472	408.1	405.1	617.2
StandardError	1394.1	1378.4	1372.8	1371.1
MARRIED				
ParameterEstimate	-6122.9	-6089.7[a]	-6065.3[a]	-5986.8[a]
StandardError	1199.9	1201.68	1201.2	1206.3
#households				
ParameterEstimate	-2514.3	-2514.4[a]	-2535.9[a]	-2532.9[a]
StandardError	349.8	350.39	350.3	351.2
Dropout				
ParameterEstimate	-3044.4	-2953.6	-2927.8	-2714.3
StandardError	1837.12	1837.7	1836.6	1838.3
Somecollge				
ParameterEstimate	5339.9	5380.3[a]	5347.8[a]	5409[a]
StandardError	1123.8	1125.5	1124.2	1128
College				
ParameterEstimate	10510.1	10599[a]	10663[a]	10673[a]
StandardError	1373.0	1373.7	1375.4	1376.4
Collgplus				
ParameterEstimate	16090	16090[a]	16083.9[a]	16091[a]
StandardError	1517	1520	1518	1523.8
SCALE	14509.6	14530	14523	14565
	(10I)	(10H)	(11H)	(13H)
NonCensord Values	961	961	961	961
DF	30	30	30	30
Log Likelihood	-11457	-11459	-13748	-11462

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

The numbers present the estimated parameters of Tobit regression.

Constructing instrumental variables by using parental mental disorders interferes with life and hospitalization and youth mental disorders

Mental disorders and other control variables as identifying variables.

TABLE A.4.10
TOBIT ESTIMATION FOR ANNUAL INCOME
INSTRUMENTING LIFETIME MENTAL DISORDERS
FOR MALES (N=1206)

VAIRABLE	(10I)	(10H)	(11I)	(11H)
INTERCEPT				
ParameterEstimate	-37467[a]	-37448[a]	-41381[a]	-38946[a]
StandardError	10361	10383.4	10298	10251.2
MOOD-LIFEHAT				
ParameterEstimate	7477	3059.1	896.0	4049.7
StandardError	9673	10753.8	9079.5	9626.3
ANXIETY-LIFEHAT				
ParameterEstimate	167.3	-2384.7	6385.3	-7609.8
StandardError	9016	9801.2	7904.6	9580.4
ALCOHOL-LIFEHAT				
ParameterEstimate	-10150	-6625.9	-8826.8	62.84
StandardError	6392	8370.6	5530.2	7744.7
DRUG-LIFEHAT				
ParameterEstimate	16692[b]	15774.3[b]	10688.8	10382.2
StandardError	7839	8208.6	7372.6	6656.4
SPOUSEINCOME				
ParameterEstimate	0.0485	0.052	0.0532	0.0488
StandardError	0.0464	0.046	0.0464	0.046
ASSET				
ParameterEstimate	0.005[a]	0.005[a]	0.005[a]	0.005[a]
StandardError	0.000	0.000	0.000	0.000
AGE				
ParameterEstimate	2442[a]	2476.1[a]	2663.8[a]	2606.4[a]
StandardError	559	564.7	555.0	552.1
AGESQUARE				
ParameterEstimate	-22.61[a]	-22.99[a]	-25.83[a]	-24.84[a]
StandardError	7.646	7.709	7.579	7.49
GOODHEALTH				
ParameterEstimate	4090[c]	3794.5	3745.5	4006[c]
StandardError	2362	2370.6	2351.5	2348.0
BLACK				
ParameterEstimate	-4461[b]	-4378.9[c]	-4662.3[b]	-3627.3
StandardError	2312	2328.1	2267.5	2270.9
HISPANIC				
ParameterEstimate	-8624[a]	-8989.4[a]	-8464.7[a]	-9669.7[a]
StandardError	2318	2390.3	2288.6	2373.7
OTHERRACES				
ParameterEstimate	-73497[b]	-7660.8[b]	-7823.5[b]	-7489.8[b]
StandardError	3549	3552.4	3555.6	3549.4
PROTESTANT				
ParameterEstimate	-4505[a]	-4211.5[a]	-4299.8[a]	-4002.0[a]
StandardError	1412	1460.2	1408.7	1449.3
OTHERRELIGION				
ParameterEstimate	-10140[a]	-9818.0[a]	-8783.9[a]	-10125.2[a]
StandardError	3331.3	3327.7	3289.4	3295.2

(Continued on following page)

TABLE A.4.10 (CONTINUED)

VARIABLE	FEMALES			MALES
NORELIGION				
ParameterEstimate	-1090.8	-1097.5	-984.2	-1353.6
StandardError 2133	2136.4	2127.7	2127.7ENGLISH	
ParameterEstimate	-377.8	335.8	-65.64	841.1
StandardError	2116	2310.7	2091.2	2270.7
INTACTFAMILY				
ParameterEstimate	1665	1347.3	1726.2	909.5
StandardError	1680	1742.2	1663.3	1729.9
EDUCATION-F-S				
ParameterEstimate	649.6[a]	602.7[a]	679.5[a]	540.8[a]
StandardError	202	208.8	197.9	206.5
SIBLINGS				
ParameterEstimate	75.5	39.80	74.62	-90.81
StandardError	287.2	296.1	280.9	287.8
MOVED				
ParameterEstimate	-443	-367.4	-403.14[c]	-351.1
StandardError	219.5	235.0	217.2	228.3
RURAL				
ParameterEstimate	1245.8	1132.3	1047.0	1035.4
StandardError	1338.4	1346.7	1338.6	1343.5
NORTHEAST				
ParameterEstimate	-1021.9	-810.2	-1085.5	-528.4
StandardError	1615.3	1645.1	1610.3	1643.0
MIDWEST				
ParameterEstimate	-2166	-2196.9	-2509.2[c]	-2277.3
StandardError	1456	1457.7	1454.6	1454.2
WEST				
ParameterEstimate	-3582[b]	-3649.1[b]	-3044.3[c]	-3809.3[b]
StandardError	1770	1769.1	1749.5	1758.1
MARRIED				
ParameterEstimate	2078	2155.6	2124.4	2241.6
StandardError	1537	1539.7	1538.9	1538.4
#households				
ParameterEstimate	-728.3[b]	-738.8[b]	-744.3[b]	-772.2[b]
StandardError	362.6	362.9	362.6	362.5
Dropout				
ParameterEstimate	-3005	-2944.8	-3070.2	-2970.6
StandardError	2111	2112.1	2114.6	2117.4
Somecollge				
ParameterEstimate	1359	1394.1	1323.7	1348.0
StandardError	1455	1457.2	1455.8	1457.2
College				
ParameterEstimate	9967[a]	10016.4[a]	10093[a]	10051[a]
StandardError	1633	1636.2	1638.2	1637.8
Collgplus				
ParameterEstimate	14622[a]	148193.4[a]	14492.9	14847.2[a]
StandardError	1895	1893.4	1898.4	1894.1
SCALE				
ParameterEstimate	18640	18668	18663	18673.1
StandardError	382.8	383.3	383.2	383.4

	(10I)	(10H)	(11I)	(11H)
NonCensord Values	1045	1045	1045	1045
DF	30	30	30	30
Log Likelihood	-13745.6	-13747.4	-13747.1	-13748

The numbers present the estimated parameters of Tobit regression.

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

The numbers present the estimated parameters of Tobit regression

Constructing instrumental variables by using parental mental disorders interferes with life and hospitalization and youth mental disorders

Mental disorders and other control variables as identifying variables.

TABLE A.4.11
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
CONTROLLING FOR CURRENT MENTAL DISORDERS
FOR FEMALES (N = 1367) AND MALES (N=1206)

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(12)	(12)
INTERCEPT		
MarginalEffect	-0.076	0.088
OddsRatio	.	.
StandardError	1.232	2.55
MOOD-12		
MarginalEffect	-0.037	-0.001
OddsRatio	0.695	0.927
Standard Error	0.266	0.598
ANXIETY-12		
MarginalEffect	-0.058	0.001
OddsRatio	0.567	1.048
Standard Error	0.197	0.476
ALCOHOL-12		
MarginalEffect	0.094	-0.020
OddsRatio	2.507	0.344
Standard Error	0.432	0.394
DRUG-12		
MarginalEffect	-0.100	0.015
OddsRatio	0.374	2.228
Standard Error	0.619	0.896
AGE		
MarginalEffect	0.025	-0.000
OddsRatio	1.277	0.980
Standard Error	0.245	0.146
AGE2		
MarginalEffect	-0.000	0.000
OddsRatio	0.997	1.00
StandardError	0.001	0.002
GOOD HEALTH		
MarginalEffect	0.057	0.010
OddsRatio	1.743	1.649
StandardError	0.276	0.516
BLACK		
MarginalEffect	-0.014	-0.022
OddsRatio	0.871	0.318
StandardError	0.306	0.466
HISPANIC		
MarginalEffect	-0.040	-0.022
OddsRatio	0.676	0.317
StandardError	0.372	0.480
OTHRACE		
MarginalEffect	-0.014	-0.031
OddsRatio	0.872	0.196
StandardError	0.505	0.626
StandardError	0.220	0.439
PROTESTANT		
MarginalEffect	-0.056	-0.010
OddsRatio	0.576	0.671
OTHERRELIGION		
MarginalEffect	-0.080	-0.034
OddsRatio	0.457	0.166

StandardError	0.365	0.594

(Continued on following page)

TABLE A.4.11(CONTINUED)

VARIABLE	FEMALES	MALES
NO RELIGION		
MarginalEffect	-0.084	-0.006
OddsRatio	0.441	0.750
StandardError	0.356	0.623
ENGLISH		
MarginalEffect	-0.013	-0.003
OddsRatio	0.878	0.854
StandardError	0.314	0.479
INTACT FAMILY		
MarginalEffect	-0.020	-0.001
OddsRatio	0.822	0.939
StandardError	0.240	0.419
PARENT-EDUCATION		
MarginalEffect	-0.002	-0.000
OddsRatio	0.978	0.999
StandardError	0.028	0.049
SIBLINGS		
MarginalEffect	-0.004	0.002
OddsRatio	0.962	1.094
StandardError	0.034	0.064
MOVED		
MarginalEffect	-0.004	-0.000
OddsRatio	0.957	0.993
StandardError	0.022	0.037
RURAL		
MarginalEffect	0.002	-0.013
OddsRatio	1.021	0.518
StandardError	0.230	0.343
NORTHEAST		
MarginalEffect	0.000	0.008
OddsRatio	1.000	1.506
StandardError	0.248	0.502
MIDWEST		
MarginalEffect	-0.042	0.010
OddsRatio	0.660	1.673
StandardError	0.216	0.462
WEST		
MarginalEffect	-0.004	-0.007
OddsRatio	0.962	0.700
StandardError	0.255	0.423
MARRIED		
MarginalEffect	0.012	0.005
OddsRatio	1.126	1.272
StandardError	0.242	0.417
HOUSEHOLD#		
MarginalEffect	-0.023	-0.005
OddsRatio	0.797	0.788
StandardError	0.062	0.079
DROPOUT		
MarginalEffect	-0.11	-0.026
OddsRatio	0.339	0.260
StandardError	0.259	0.416
SOMECOLG		
MarginalEffect	0.068	-0.010
OddsRatio	1.940	0.582
StandardError	0.227	0.386
COLLGE		
MarginalEffect	0.079	0.017

OddsRatio	2.169	2.379
StandardError	0.294	0.669

(Continued on following page)

TABLE A.4.11(CONTINUED)

VARIABLE	FEMALES	MALES
COLGPLUS		
MarginalEffect	0.191	0.029
OddsRatio	6.484	4.570
StandardError	0.462	1.096
SPOUSEINCOME		
MarginalEffect	-0.000	-0.000
OddsRatio	1.000	1.000
StandardError	0.000	0.000
ASSETS		
MarginalEffect	0.000	-0.000
OddsRatio	1.000	1.000
StandardError	0.000	0.000

SPECIFICATIONS	FEMALES	MALES
# OF OBSERVATIONS	1367	1175
-2 LOG L	986.7	382.3
DF	30	30
chi-square	214.3	99.6

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

TABLE A.4.12
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
INSTRUMENTING CURRENT MENTAL DISORDERS
FOR FEMALES (N=1367)

VARIABLES	13I	13H	14 I	14H
INTERCEPT				
MARGINALEFFCET	-0.03	-0.026	-0.030	-0.026
ODDSRATIO	.	.	.	.
STANDARDERROR	1.250	1.248	1.247	1.248
MOOD12HAT				
MARGINALEFFCET	-0.209	-0.205	-0.015	-0.205
ODDSRATIO	0.127	0.132	0.222	0.132
STANDARDERROR	1.411	1.909	1.138	1..909
ANXIETY12HAT				
MARGINALEFFCET	-0.070	-0.050	-0.071	-0.050
ODDSRATIO	-0.692	0.608	0.497	0.608
STANDARDERROR	0.645	0.703	0.597	0.703
ALCOHOL12HAT				
MARGINALEFFCET	-0.008	-0.168	-0.036	-0.168
ODDSRATIO	0.929	0.192	0.700	0.192
STANDARDERROR	1.505	1.518	1.387	1.518
DRUG12HAT				
MARGINALEFFCET	-0.017	0.223	-0.079	0.223
ODDSRATIO	0.746	9.01	0.459	9.01
STANDARDERROR	-0.167	2.169	1.517	2.169
SPOUSEINCOME				
MARGINALEFFECT	-0.000[a]	-0.000	-0.000[a]	-0.000[a]
ODDSRATIO	1.000	1.000	1.000	1.000
STANDARDERROR	0.000	0.000	0.000	0.000
ASSET				
MARGINALEFFECT	0.000	0.000	0.000	0.000
ODDSRATIO	1.000	1.000	1.000	1.000
STANDARDERROR	0.000	0.000	0.000	0.000
AGE				
MARGINALEFFECT	0.025[a]	0.025[a]	0.025[a]	0.025[a]
ODDSRATIO	1.285	1.281	1.284	1.281
STANDARDERROR	0.070	10.070	0.069	0.070
AGE2				
MARGINALEFFECT	-0.000[a]	-0.000[a]	-0.000	-0.000[a]
ODDSRATIO	0.997	0.997	0.997a	0.997
STANDARDERROR	0.001	0.001	0.000	0.001
GOODHEALTH				
MARGINALEFFECT	0.017	0.031	0.025	0.031
ODDSRATIO	1.187	1.354	1.277	1.354
STANDARDERROR	0.361	0.438	0.333	0.438
BLACK				
MARGINALEFFECT	-0.017	-0.029	-0.019	-0.029
ODDSRATIO	0.844	0.750	0.829	0.750
STANDARDERROR	0.316	0.319	0.310	0.319
HISPANIC				
MARGINALEFFECT	-0.029	-0.036	-0.035	-0.036
ODDSRATIO	0.751	0.700	0.711	0.700
STANDARDERROR	0.395	0.409	0.388	0.409
OTHER RACES				
MARGINALEFFECT	-0.027	-0.028	-0.027	-0.028
ODDSRATIO	0.765	0.760	0.763	0.760
STANDARDERROR	0.503	0.501	0.500	0.501

(Continued on following page)

TABLE A.4.12 (CONTINUED)

VARIABLE	FEMALES		MALES	
PROTESTANT				
MARGINALEFFECT	-0.050[b]	-0.052[b]	-0.052[b]	-0.052[b]
ODDSRATIO	0.610	0.598	0.601	0.598
STANDARDERROR	0.219	0.221	0.218	0.221
OTHERELIG				
MARGINALEFFECT	-0.065[c]	-0.064[c]	-0.067[c]	-0.064[c]
ODDSRATIO	0.524	0.533	0.517	0.533
STANDARDERROR	0.371	0.368	0.369	0.368
NO RELIGION				
MARGINALEFFECT	-0.067[c]	-0.063[c]	-0.063[c]	-0.063[c]
ODDSRATIO	0.517	0.540	0.539	0.540
STANDARDERROR	0.378	0.378	0.377	0.378
ENGLISH				
MARGINALEFFECT	-0.004	-0.008	-0.009	-0.008
ODDSRATIO	0.959	0.923	0.917	0.923
STANDARDERROR	0.332	0.334	0.327	0.334
INTACT FAMILY				
MARGINALEFFECT	-0.012	-0.018	-0.016	-0.018
ODDSRATIO	0.887	0.835	0.854	0.835
STANDARDERROR	0.257	0.274	0.250	0.274
PARENT-EDUCATION				
MARGINALEFFECT	-0.002	-0.003	-0.002	-0.003
ODDSRATIO	0.978	0.974	0.976	0.974
STANDARDERROR	0.029	0.029	0.029	0.029
SIBLIINGS				
MARGINALEFFECT	-0.003	-0.003	-0.004	-0.003
ODDSRATIO	0.968	0.976	0.966	0.976
STANDARDERROR	0.035	0.035	0.035	0.035
MOVED				
MARGINALEFFECT	-0.003	-0.003	-0.004	-0.003
ODDSRATIO	0.967	0.968	0.965	0.968
STANDARDERROR	0.025	0.027	0.024	0.0265
RURAL				
MARGINALEFFECT	-0.003	-0.003	-0.004	-0.003
ODDSRATIO	0.967	0.972	0.961	0.972
STANDARDERROR	0.232	0.233	0.233	0.233
NEAST				
MARGINALEFFECT	0.001	0.009	0.003	0.009
ODDSRATIO	1.006	1.088	1.030	1.088
STANDARDERROR	0.258	0.259	0.256	0.259
MIDWEST				
MARGINALEFFECT	-0.036	-0.028	-0.038[c]	-0.028
ODDSRATIO	0.702	0.761	0.689	0.761
STANDARDERROR	0.228	0.228	0.226	0.228
WEST				
MARGINALEFFECT	-0.005	-0.004	-0.003	-0.004
ODDSRATIO	0.953	0.963	0.969	0.963
STANDARDERROR	0.257	0.256	0.256	0.256
MARRIED				
MARGINALEFFECT	0.006	0.004	0.009	0.004
ODDSRATIO	1.061	1.041	1.096	1.041
STANDARDERROR	0.243	0.243	0.243	0.243
HOUSEHOLD#				
MARGINALEFFECT	-0.024[a]	-0.024[a]	-0.023[a]	-0.024[a]
ODDSRATIO	0.792	0.793	0.794	0.793
STANDARDERROR	0.062	0.062	0.062	0.062
DROPOUT				
MARGINALEFFECT	-0.101[a]	-0.099[a]	-0.102[a]	-0.099[a]
ODDSRATIO	0.369	0.375	0.366	0.375
STANDARDERROR	0.259	0.260	0.259	0.260

(Continued on following page)

TABLE A.4.12 (CONTINUED)

VARIABLE	FEMALES		MALES	
SOMECOLG				
MARGINALEFFECT	0.071[a]	0.073[a]	0.070[a]	0.073[a]
ODDSRATIO	2.017	2.051	1.987	2.051
STANDARDERROR	0.228	0.227	0.227	0.227
COLLEGE				
MARGINALEFFECT	0.077[a]	0.079[a]	0.081[a]	0.079[a]
ODDSRATIO	2.133	2.169	2.214	2.169
STANDARDERROR	0.291	0.291	0.293	0.290
COLEGPLUS				
MARGINALEFFECT	0.185[a]	0.190[a]	0.081[a]	0.190[a]
ODDSRATIO	6.213	6.487	6.234	6.487
STANDARDERROR	0.462	0.463	0.462	0.463

SPECIFICATIONS	(13I)	(13H)	(14I)	(14H)
# OF OBSERVATIONS	1367	1367	1367	1367
-2 LOG L	984	985.8	983.8	985.8
DF	30	30	30	30
chi-square	216.9	215.2	217.2	215.2

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

Constructing instrumental variables by using parental mental disorders interferes with life and hospitalization and youth

Mental disorders and other control variables as identifying variables.

TABLE A.4.13
WEIGHTED LOGISTIC ANALYSIS OF LABOR FORCE PARTICIPATION
INSTRUMENTING CURRENTMENTAL DISORDERS
FOR MALES (N=1206)

VARIABLES	13I	13H	14 I	14H
INTERCEPT				
MarginalEffect	0.090	0.096	0.093[c]	0.096
OddsRatio	.	.	.	.
StandardError	2.763	2.781	2.734	2.753
MOOD-12HAT				
MarginalEffect	-0.082	-0.097	-0.070	-0.056
OddsRatio	0.018	0.008	0.033	0.063
StandardError	3.023	3.050	2.792	2.930
ANXIETY-12HAT				
MarginalEffect	0.029	0.058	0.026	0.038
OddsRatio	4.158	17.38	3.587	6.573
StandardError	2.366	2.339	2.017	2.238
ALCOHOL-12HAT				
MarginalEffect	-0.004	-0.045	-0.005	-0.032
OddsRatio	0.811	0.109	0.787	0.205
StandardError	1.763	2.003	1.605	1.926
DRUG-12HAT				
MarginalEffect	0.023	0.079	0.015	0.040
OddsRatio	3.086	48.47	2.061	7.069
StandardError	2.939	3.594	2.723	2.882
SPOUSEINCOME				
MarginalEffect	-0.000	-0.000	-0.000	-0.000
OddsRatio	1.000	1.000	1.000	1.000
StandardError	0.000	0.000	0.000	0.000
ASSET				
MarginalEffect	-0.000	-0.000	-0.000	-0.000
OddsRatio	1.000	1.000	1.000	1.000
StandardError	0.000	0.000	0.000	0.000
AGE				
MarginalEffect	-0.000	-0.00	-0.000	-0.001
OddsRatio	0.983	0.941	0.797	0.954
StandardError	0.154	0.155	0.152	0.154
AGESQUARE				
MarginalEffect	0.000	0.000	0.000	-0.000
OddsRatio	1.000	1.001	1.000	1.001
StandardError	0.002	0.002	0.002	0.002
GOODHEALTH				
MarginalEffect	0.005	0.006	0.005	0.007
OddsRatio	1.251	1.333	1.258	1.408
StandardError	0.542	0.542	0.546	0.535
BLACK				
MarginalEffect	-0.024[b]	-0.025[a]	-0.024[b]	-0.024[b]
OddsRatio	0.315	0.289	0.313	0.312
StandardError	0.506	0.492	0.498	0.490
OTHERRACES				
MarginalEffect	-0.033[a]	-0.032[a]	-0.033[a]	-0.03[a]
OddsRatio	0.195	0.204	0.195	0.210
StandardError	0.625	0.627	0.625	0.623

(Continued on following page)

TABLE A.4.13 (CONTINUED)

VARIABLE	FEMALES		MALES	
PROTESTANT				
MarginalEffect	-0.008	-0.008	-0.007	-0.008
OddsRatio	0.691	0.688	0.701	0.663
StandardError	0.456	0.464	0.458	0.457
OTHERRELIGION				
MarginalEffect	-0.033[a]	-0.032[a]	-0.033[a]	-0.035[a]
OddsRatio	0.197	0.203	0.197	0.182
StandardError	0.638	0.634	0.633	0.627
NORELIGION				
MarginalEffect	-0.006	-0.005	-0.006	-0.006
OddsRatio	0.736	0.769	0.757	0.754
StandardError	0.626	0.628	0.627	0.626
ENGLISH				
MarginalEffect	0.001	-0.002	0.001	-0.002
OddsRatio	1.052	0.906	0.1026	0.898
StandardError	0.544	0.560	0.534	0.549
INTACTFAMILY				
MarginalEffect	-0.002	-0.001	-0.001	-0.001
OddsRatio	0.925	0.958	0.933	0.953
StandardError	0.422	0.420	0.422	0.420
EDUCATION-F-S				
MarginalEffect	0.000	0.001	0.000	0.000
OddsRatio	1.013	1.041	1.011	1.025
StandardError	0.053	0.055	0.052	0.055
SIBLINGS				
MarginalEffect	0.002	0.003[b]	0.002	0.002[c]
OddsRatio	1.112	1.156	1.107	1.124
StandardError	0.072	0.072	0.069	0.071
MOVED				
MarginalEffect	0.001	0.001	0.000	0.000
OddsRatio	1.028	1.026	1.024	1.008
StandardError	0.050	0.052	0.050	0.353
RURAL				
MarginalEffect	-0.014[b]	-0.015[b]	-0.014[b]	-0.014[b]
OddsRatio	0.501	0.482	0.497	0.499
StandardError	0.357	0.356	0.355	0.353
NORTHEAST				
MarginalEffect	0.005	0.003	0.005	0.005
OddsRatio	1.287	1.141	1.305	1.256
StandardError	0.544	0.540	0.528	0.538
MIDWEST				
MarginalEffect	0.008	0.008	0.008	0.009
OddsRatio	1.446	1.497	0.451	1.524
StandardError	0.473	0.479	0.473	0.477
WEST				
MarginalEffect	-0.010	-0.012	-0.010	-0.100
OddsRatio	0.604	0.558	0.617	0.612
StandardError	0.447	0.455	0.446	0.452
MARRIED				
MarginalEffect	0.008	0.007	0.007	0.007
OddsRatio	1.447	1.427	1.421	1.402
StandardError	0.420	0.422	0.423	0.419
#households				
MarginalEffect	-0.005[a]	-0.005[a]	-0.005[a]	-0.005[a]
OddsRatio	0.785	0.786	0.787	0.789
StandardError	0.079	0.079	0.078	0.079
Dropout				
MarginalEffect	-0.027[a]	-0.027[a]	-0.027[a]	-0.026[a]
OddsRatio	0.263	0.265	0.268	0.276
StandardError	0.435	0.431	0.435	0.428

(Continued on following page)

TABLE A.4.13 (CONTINUED)

VARIABLE	FEMALES		MALES	
Somecollge				
MarginalEffect	-0.010	-0.010	-0.010	-0.010
OddsRatio	0.610	0.601	0.611	0.608
StandardError	0.387	0.388	0.386	0.386
College				
MarginalEffect	0.018	0.017	0.018	0.018
OddsRatio	2.384	2.353	2.424	2.101
StandardError	0.663	0.665	0.663	0.664
Collgplus				
MarginalEffect	0.035	0.033	0.034	0.034
OddsRatio	5.427	5.056	5.37	5.169
StandardError	1.087	1.089	1.087	1.089

SPECIFICATIONS	(13I)	(13H)	(14I)	(14H)
# OF OBSERVATIONS	1206	1206	1367	1367
-2 LOG L	387.4	384.3	387.6	387.4
DF	30	30	30	30
chi-square	94.4	97.5	94.2	94.4

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

Constructing instrumental variables by using parental mental disorders interferes with life and hospitalization and youth

Mental disorders and other control variables as identifying variables.

TABLE A.4.14
OLS ESTIMATION OF ANNUAL INCOME
CONTROLLING FOR CURRENT MENTAL DISORDERS
FOR FEMALES (N=1367) AND MALES (N=1206)

VARIABLES	FEMALES	MALES
SPECIFICATIONS	(12)	(12)
INTERCEPT		
Parameter Estimate	-23329[a]	-42301[a]
Standard Error	6753.8	10051.3
MOOD-12		
Parameter Estimate	-815.48	721.88
Standard Error	1506.8	2627.66
ANXIETY-12		
Parameter Estimate	-2588.4[b]	2041.64
Standard Error	1082.8	1924.12
ALCOHOL-12		
Parameter Estimate	2646.6	742.93
Standard Error	1895.5	1922.3
DRUG-12		
Parameter Estimate	-1683.6	-2363.7
Standard Error	4220.3	3286.1
AGE		
Parameter Estimate	2277.8[a]	2767.2[a]
Standard Error	354.0	533.9
AGE2		
Parameter Estimate	-29.88[a]	-27.87[a]
Standard Error	4.833	7.14
GOOD HEALTH		
Parameter Estimate	1634.12	4544.8[b]
Standard Error	1743.16	2353.2
BLACK		
Parameter Estimate	-27.35	-2764.4
Standard Error	1421.83	2155.5
HISPANIC		
Parameter Estimate	3210.3	-6397.7[a]
Standard Error	2141.83	2342.7
OTHRACE		
Parameter Estimate	2192.83	-2523.4
Standard Error	2478.8	3769.4
PROTESTANT		
Parameter Estimate	1148.0	-3805.7[a]
Standard Error	988.6	1417.2
OTHERRELIGION		
Parameter Estimate	3672.8[b]	-3178.9
Standard Error	1771.0	3238.2
NO RELIGION		
Parameter Estimate	-14.89	-1794.4
Standard Error	1870.1	2163.2
ENGLISH		
Parameter Estimate	4760.4[a]	-239.5
Standard Error	1521.1	2059.6
INTACT FAMILY		
Parameter Estimate	-1393.4	1097
Standard Error	1193.4	1678.8

(Continued on following page)

TABLE A.4.14(CONTINUED)

VARIABLE	FEMALES	MALES
PARENT-EDUCATION		
Parameter Estimate	148.0	556.03[a]
Standard Error	133.0	191.2
SIBLINGS		
Parameter Estimate	-286.5[c]	-148.4
Standard Error	176.1	257.9
MOVED		
Parameter Estimate	-79.11	-276.8
Standard Error	165.7	197.55
RURAL		
Parameter Estimate	959.03	2210.23
Standard Error	1094.5	1374.7
NORTHEAST		
Parameter Estimate	3075.6[a]	-1115.5
Standard Error	1146.7	1640.3
MIDWEST		
Parameter Estimate	-1475.8	-2923.9[b]
Standard Error	1082.2	1481.3
WEST		
Parameter Estimate	2812.5[b]	-2765.2
Standard Error	1210.1	1714.2
MARRIED		
Parameter Estimate	-9025.6[a]	1710.6
Standard Error	1147.6	1595.7
HOUSEHOLD#		
Parameter Estimate	-1988.6[a]	-236.1
Standard Error	332.7	377.5
DROPOUT		
Parameter Estimate	3987.9[b]	-690.4
Standard Error	1983.7	2227.5
SOMECOLG		
Parameter Estimate	3606.2[a]	3471.9[b]
Standard Error	1046.5	1514.5
COLLGE		
Parameter Estimate	8633.7[a]	9527.1[a]
Standard Error	1259.8	1676.1
COLGPLUS		
Parameter Estimate	12111[a]	14163[a]
Standard Error	1361.4	1939.4
SPOUSEINCOME		
Parameter Estimate	0.1239[a]	0.052
Standard Error	0.0249	0.049
ASSETS		
Parameter Estimate	0.002[a]	0.005[a]
Standard Error	0.000	0.001
F VALUE	21.0[a]	20.9[a]
ADJ R-SQ	0.39	0.36
# of Observation	1417	1206
DF	30	30

Marginal effects are partial derivative with respect to the vector of characteristics computed at the means of the Xs

* indicates statistical significance at $\alpha \leq .10$; ** at $\alpha \leq .05$; *** at $\alpha \leq .01$

TABLE A.4.15
TOBIT ESTIMATION FOR ANNUAL INCOME
INSTRUMENTING CURRENT MENTAL DISORDERS
FOR FEMALES (N=1367)

VAIRABLE	(12I)	(12H)	(13I)	(13H)
INTERCEPT				
ParameterEstimate	-31473.3[a]	-30367.4	-31238.9[a]	-31353.2[a]
StandardError	7269.8	7289.7	7280.7	7300
MOOD-12HAT				
ParameterEstimate	-8289.8	-12443.2	-6800.5	-6549.0
StandardError	8654.8	11625.0	7178.0	10817.8
ANXIETY-12HAT				
ParameterEstimate	-10487.5[a]	-7548.7	-9156.9a	-9795.6[a]
StandardError	9480.6	4041.7	3477.3	3764.7
ALCOHOL-12HAT				
ParameterEstimate	24888.9[a]	20227.4	20691.2[b]	24927.2
StandardError	9480.6	9304.7	8661.9	8791.5
DRUG-12HAT				
ParameterEstimate	-7095.4	-11456.5	-9704.8	-15366.1
StandardError	10724.5	13699.5	11053.7	12403.7
SPOUSEINCOME				
ParameterEstimate	-0.0301	-0.0315	-0.030	-0.0321
StandardError	0.0237	0.0237	0.0238	0.0237
ASSET				
ParameterEstimate	0.0022[a]	0.0023	0.002[a]	0.0023[a]
StandardError	0.0004	0.000	0.000	0.0004
AGE				
ParameterEstimate	2992.7a	2942.5	2940.7[a]	2955.5[a]
StandardError	383.4	382.5	382.7	382.83
AGESQUARE				
ParameterEstimate	-35.55[a]	-35.121	-34.97[a]	-35.10[a]
StandardError	5.218	5.214	45.01	5.215
GOODHEALTH				
ParameterEstimate	1950.8	1328.7	2472.7	2166.0
StandardError	2247.1	2636.6	2059.6	2569.0
BLACK				
ParameterEstimate	-289.9	-127.2	-371.6	-164.66
StandardError	1570.4	1608.2	1562.4	1600.96
HISPANIC				
ParameterEstimate	1705.05	1711.5	1398.9	1497.4
StandardError	2301.2	2365.6	2266.0	2355.5
OTHERRACES				
ParameterEstimate	340.57	320.01	319.23	556.66
StandardError	2651.6	2652.2	2653.5	2652.4
PROTESTANT				
ParameterEstimate	-647.11	-601.23	-631.31	-667.13
StandardError	1064.3	1071.8	1065.4	1071.5
OTHERRELIGION				
ParameterEstimate	-823.75	-634.2	-752.8	-835.1
StandardError	1887.04	1887.6	1888.1	1885.0
NORELIGION				
ParameterEstimate	-2792.2	-2314.5	-2582.2	-2541.2
StandardError	2051.8	2049.0	2045.8	2049.1
ENGLISH				
ParameterEstimate	5590.1[a]	5401.8	5355.1[a]	5375.3[a]
StandardError	1681.0	1689.5	1669.7	1688.7

(Continued on following page)

TABLE A.4.15 (CONTINUED)

VARIABLE	FEMALES		MALES	
INTACTFAMILY				
ParameterEstimate	-3144.6[b]	-2813.1	-3182.7[b]	-3097.7[b]
StandardError	1359.8	1434.1	1335.2	1418.4
EDUCATION-F-S				
ParameterEstimate	96.80	111.80	98.96	103.19
StandardError	147.05	148.2	147.0	147.98
SIBLINGS				
ParameterEstimate	-417.3[b]	-415.06	-417.8[b]	-436.5[b]
StandardError	185.34	186.27	185.7	185.82
MOVED				
ParameterEstimate	-487.31[a]	-444.89	-485.9[a]	-487.9[a]
StandardError	156.28	162.14	153.6	159.9
RURAL				
ParameterEstimate	106.61	108.36	69.97	57.88
StandardError	1195.8	1200.8	1195.0	1198.8
NORTHEAST				
ParameterEstimate	1088.0	1227.8	1261.9	1148.9
StandardError	1281.5	1283.8	1272.7	1279.8
MIDWEST				
ParameterEstimate	-5020.3[a]	-4748.2	-4891.9[a]	-5040.2[a]
StandardError	1200.3	1201.0	1195.8	1188.5
WEST				
ParameterEstimate	1377.5	1486.1	1490.8	1446.7
StandardError	1317.4	1317.8	1319.2	1319.4
MARRIED				
ParameterEstimate	-6104.3[a]	-6042.6	-5995.9[a]	-6020.3[a]
StandardError	1204.3	1205.1	1205.7	1205.1
#HOUSEHOLDS				
ParameterEstimate	-2573.4[a]	-2572.8	-2562.7[a]	-2545.3[a]
StandardError	351.9	352.2	352.3	351.88
DROPOUT				
ParameterEstimate	-3021.8[c]	-2956.7	-3079.7[c]	-3023.0[c]
StandardError	1844.3	1844.2	1845.6	1845.6
SOMECOLLEGE				
ParameterEstimate	5234.8[a]	5266.2	5176.8[a]	5285.8[a]
StandardError	1128.4	1128.1	83537.6	1127.0
COLLEGE				
ParameterEstimate	10800.3[a]	1076.0	10851.6[a]	10797.0[a]
StandardError	1378.7	1379.4	1382.8	1379.1
Collgplus				
ParameterEstimate	15901.6[a]	15964.2	15941.6[a]	16044.8[a]
StandardError	1521.05	1521.5	1521.7	1520.7
SCALE				
ParameterEstimate	14569.4	14580.9	14582.4	14575.7
StandardError	333.1	333.39	333.4	333.2

	(12I)	(12H)	(13I)	(13H)
NonCensord Values	961	961	961	961
DF	30	30	30	30
Log Likelihood	-11461.6	-11463	-11462	-11462.2

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$

The numbers present the estimated parameters of Tobit regression

Constructing instrumental variables by using parental mental disorders interferes with life and hospitalization and youth

Mental disorders and other control variables as identifying variables.

TABLE A. 4.16
TOBIT ESTIMATION FOR ANNUAL INCOME
INSTRUMENTING CURRENT MENTAL DISORDERS
FOR MALES (N=1206)

VAIRABLE	(12I)	(12H)	(13I)	(13H)
INTERCEPT				
ParameterEstimate	-47116[a]	-44376[a]	-44441[a]	-42863[a]
StandardError	10489	10548.9	10339	10480.6
MOOD-12HAT				
ParameterEstimate	13949.9	-5274.3	7226.8	9333.0
StandardError	14186.6	14547.7	12684.5	13646.1
ANXIETY-12HAT				
ParameterEstimate	-2305.1	11106.4	8149.8	6567.9
StandardError	10187.7	9684.1	8242.6	9489.5
ALCOHOL-12HAT				
ParameterEstimate	-2222.8	-13738.6	-7447.9	-11152.6
StandardError	7806.4	9366.4	6770.5	8984.6
DRUG-12HAT				
ParameterEstimate	21149.9	38780.1[b]	11688.5	21583.7
StandardError	15168.4	18525.6	13416.0	15210.4
SPOUSEINCOME				
ParameterEstimate	0.0477	0.0477	0.0496	0.0500
StandardError	0.0463	0.0464	0.0464	0.0464
ASSET				
ParameterEstimate	0.005[a]	0.0051[a]	0.0050[a]	0.0050[a]
StandardError	0.000	0.000	0.000	0.000
AGE				
ParameterEstimate	2962.7[a]	2739.9[a]	2820.2[a]	2733.5[a]
StandardError	552.8	560.89	543.6	558.0
AGESQUARE				
ParameterEstimate	-29.58[a]	-26.69[a]	-28.024[a]	-26.89[a]
StandardError	7.280	7.399	7.1839	7.368
GOODHEALTH				
ParameterEstimate	4638.2[b]	4601.8[b]	4720.0[b]	4770.3[b]
StandardError	2332.8	2367.9	2321.5	2349.8
BLACK				
ParameterEstimate	-3225.1	-4368.9[b]	-3764.0[c]	-3897.2[c]
StandardError	2178.3	2153.5	2147.5	2152.1
HISPANIC				
ParameterEstimate	-8923.3[a]	-6982.2[a]	-8396.3[a]	-8035.4[a]
StandardError	2385.5	2449	2313.4	2420.0
OTHERRACES				
ParameterEstimate	-7152.0[b]	-7854.8[b]	-7598.9[b]	-7591.6[b]
StandardError	3530.2	3528.6	3529.6	3520.4
PROTESTANT				
ParameterEstimate	-3796.8[a]	-3751.0[a]	-4173.9[a]	-4035.5[a]
StandardError	1439.1	1456.3	1425.6	1432.7
OTHERRELIGION				
ParameterEstimate	-10249.4[a]	-9156.3[a]	-9145.2[a]	-9461.1[a]
StandardError	3180.1	3146.5	3138.9	3134.1
NORELIGION				
ParameterEstimate	-1124.6	-944.9	-1173.9	-1097.7
StandardError	2100.6	2103.3	2100.2	2102.5
ENGLISH				
ParameterEstimate	444.56	268.3	-136.3	-275.3
StandardError	2175.4	2267.4	2137.3	2205.1

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TABLE A.4.16 (CONTINUED)

VARIABLE	FEMALES		MALES	
INTACTFAMILY				
ParameterEstimate	1191.9	899.0	1144.3	1128.6
StandardError	1625.9	1628.6	1624.6	1626.7
EDUCATION-F-S				
ParameterEstimate	588.2[a]	709.5[a]	651.8[a]	637.7[a]
StandardError	199.3	197.5	195.2	198.0
SIBLINGS				
ParameterEstimate	-86.33	186.6	-14.80	30.93
StandardError	279.1	284.0	269.3	279.1
MOVED				
ParameterEstimate	-552.8[b]	-430.8[c]	-475.0[b]	-495.1[b]
StandardError	229.0	233.01	222.7	226.3
RURAL				
ParameterEstimate	1096.3	699.3	838.5	828.7
StandardError	1360.3	1350.9	1348.8	1351.5
NORTHEAST				
ParameterEstimate	-512.5	-1171.9	-1116.3	-979.0
StandardError	1686.4	1673.2	1654.3	1669.1
MIDWEST				
ParameterEstimate	-2334.4	-2506.5[c]	-2683.2[c]	-2431.2[c]
StandardError	1477.7	1478.1	1467.8	1475.0
WEST				
ParameterEstimate	-3333.7[b]	-4114.6[b]	-3369.0[b]	-3447.4[b]
StandardError	1733.4	1752.5	1715.8	1732.9
MARRIED				
ParameterEstimate	2114.8	2111.2	2152.1	2142.3
StandardError	1537.0	1538.0	1537.2	1537.9
#households				
ParameterEstimate	-698.9[b]	-717.0[b]	-737.1[b]	-724.0[b]
StandardError	363.3	363.7	362.6	363.2
Dropout				
ParameterEstimate	-3454.1	-3536.5[c]	-3293.6	-3313.6
StandardError	2142.2	2135.3	2136.5	2131.0
Somecollge				
ParameterEstimate	1303.7	1213.2	1324.0	1224.1
StandardError	1454.8	1454.8	1455.0	1456.1
College				
ParameterEstimate	9969.0[a]	9919.4[a]	10100[a]	10007.9[a]
StandardError	1633.0	1634.4	1636.9	1634.3
Collgplus				
ParameterEstimate	14561.2[a]	14558.4[a]	14491.9[a]	14652.3[a]
StandardError	1886.3	1886.9	1888.3	1887.8
SCALE				
ParameterEstimate	18647.3	18651.3	18650.8	18662.9
StandardError	382.9	383.0	383.0	383.2

	(12I)	(12H)	(13I)	(13H)
NonCensord Values	1045	1045	1045	1045
DF	30	30	30	30
Log Likelihood	-13746.3	-13746	-1374701	-13747

a indicates statistical significance at $\alpha \leq .10$; b at $\alpha \leq .05$; c at $\alpha \leq .01$