

4-1-2003

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Original Citation

Wilcox-Gök, Virginia, Farah Farahati and Dave E.Marcotte. "The Effects of Parents' Psychiatric Disorders on Children's High School Dropout." *Economics of Education Review*, Volume 22, Number 2, 2003, pp. 167-178.

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**The effects of
parents' psychiatric disorders
on
children's high school dropout**

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Received 30 November 2000; accepted 7 December 2001

Abstract

Mental illness is known to impose substantial direct costs on the ill. In this paper, we examine an indirect cost of mental illness. We investigate the effect of parents' mental illnesses on the schooling of their children. Using data from the National Comorbidity Survey, we find that parents' mental illnesses increase the probability of high school dropout of children, though these effects differ markedly by disease. We also find that parental mental illness has more consistently negative effects for girls than for boys.

These findings indicate that parental mental illness can have a powerful impact on children's schooling and subsequently on their adult lives. The larger impact on girls' schooling compounds the greater earnings and employment losses due to mental illness borne by adult women. Our results suggest that policies designed to mitigate the effects of parental mental illness on children's schooling attainment are potentially efficient uses of society's resources.

JEL classification: I1, J1

Keywords: costs, human capital, economic impact, mental illness

1. Introduction

Research on schooling attainment has established that families contribute significantly to the successful completion of high school. In this paper, we describe the effects of a particular aspect of family environment on high school completion: We examine the link between parental mental illness and children's high school dropout. While a few studies in the economics literature have reported that parents' poor physical health reduces children's schooling this is the first examination of the effect of parental psychiatric disorders on children's schooling attainment.

Kessler, McGonagle, Zhao, Nelson, Hughes, Eshleman, Wittchen, and Kendler (1994) reported that 48% of the United States population will have at least one psychiatric disorder (diagnosed or undiagnosed) during their lifetime. Beyond the costs suffered by the ill, mental illness is likely to impose serious burdens on the families of the ill.¹ Psychiatric illnesses disrupt the family environment and can subsequently have detrimental effects on the children of the ill.

We focus here on the effects of parents' mental illness on the likelihood of their children's completion of secondary school. Failure to complete high school is known to have large and long-term negative effects on a variety of social and economic dimensions of children's. We expect that, other things equal, children whose parents have a history of psychiatric disorders face a higher probability of dropping out of high school than the children of parents with no history of psychiatric disorders. If so, the true costs of mental illness would extend far beyond the costs incurred by the ill, to long term costs borne by their children.

In our empirical analysis, we use data describing 1757 women and 1632 men drawn from the National Comorbidity Survey (NCS). The NCS data are unique, providing information from a nationally representative sample about mental illness among survey respondents and family members, in addition to information about educational attainment, income, and a variety of other socio-economic characteristics of respondents and their families. Using these data, (1) we estimate high school dropout rates for men and women raised by parents with various

substance and non-substance abuse mental illnesses. We distinguish between types of mental illness and whether the mentally ill parent was the mother or father. (2) We also estimate a series of multivariate models relating parents' mental health status to children's likelihood of dropping out of high school. By quantifying the effects of parental mental illness on children's schooling attainment, we provide the first ever estimation of the magnitude of a potentially severe and long term indirect cost of mental illness borne by the children of the mentally ill. In our view, this information is important to establish the potential need for a compensatory public policy. If parental mental illness substantially impairs schooling attainment, vulnerable children may need special services and transfer programs to achieve schooling goals.

In Section 2, we provide some background on this issue. In Section 3, we present the theoretical model and state the hypotheses to be tested. The data and empirical model are described in Section 4. Section 5 contains the empirical results. We conclude in Section 6 with a discussion of the findings.

2. Background

The human capital model developed by Becker (1964) is the basis for virtually all economic studies of schooling attainment. In his work, Becker recognized the relationship between biological, economic, and cultural endowments that parents give to children and the educational and labor market outcomes that these children subsequently experience. Empirical research has indeed demonstrated that family background has a powerful influence on schooling attainment. An excellent example from the economics literature is Haveman and Wolfe's (1994) study of the determinants of high school completion. Using data from the Panel Study of Income Dynamics (PSID), Haveman and Wolfe find that several parental characteristics, including the presence of a disabled parent, are significant predictors of a child's schooling success. Manski, Sandefur, McLanahan, and Powers (1992), in an economic study using data from the National Longitudinal Study of Youth (NLSY), found that children from intact families with more educated parents have a higher probability of graduating from high school.

¹ See Marcotte and Wilcox-G \bar{k} (2000, 2001) for a review of estimates of the labor market costs of mental illness.

Empirical research reported in other literatures has identified several influential characteristics of family environment that affect children's schooling attainment. For example, Rumberger (1983) used data from the NLSY to investigate factors influencing the decision to drop out of school. Rumberger found that family background, ability, and aspirations strongly predict dropout behavior, especially for young people from lower socio-economic status families.

Although the importance of family background has been convincingly demonstrated, research in this area has largely ignored the effects of parental mental illness on schooling attainment. The notable exception is Jayakody, Danziger, and Kessler (1998) using data for men drawn from the National Comorbidity Survey. The authors find that parental psychiatric disorders do not significantly affect boys' subsequent schooling attainment. Jayakody et al. (1998) do not address the issues of whether parents' psychiatric illnesses have detrimental effects on girls' educational attainment or whether different psychiatric disorders have different effects on children's schooling. In this paper, we report our findings describing the impact of parental psychiatric disorders on children's high school dropout. We investigate whether different parental psychiatric illnesses have differential effects, whether psychiatric disorders of mothers have different effects on children than psychiatric disorders of fathers, and whether boys and girls are affected differently.

3. Theoretical model

Schooling attainment depends on many factors. These include the student's ability and other characteristics, student and parental preferences, and parental characteristics. Parental psychiatric disorders are a component of parental characteristics that may be particularly damaging to children's schooling attainment. To examine the impact of parental psychiatric disorders on schooling attainment, we use a model of human capital investment similar to those typically used in schooling attainment studies.² We posit optimal schooling as a function of individual and family characteristics and factors assumed to be exogenous:

² Our model, available on request from the authors, is similar to those of Rosen (1973) and Griliches (1977).

$$S^* = s(C, F, E),$$

(1)

where S^* represents optimal schooling attainment, C represents individual characteristics, F represents family characteristics, and E represents exogenous factors. We add the effects of parental (P) and own (I) psychiatric disorders to the model. The expanded function for optimal schooling attainment is

$$S^* = s(C, F, E, P, I). \quad (2)$$

We hypothesize that parents' mental illness will cause a decrease in the optimal level of schooling attainment, other things equal. We define the research hypothesis as $H_1: MS^*/MP < 0$, and the alternative hypothesis as $H_0: MS^*/MP \geq 0$.

The research hypothesis is illustrated in Figure 1. If parental mental illness disrupts the family environment, reducing the ability of a child to benefit from schooling, the demand for schooling shifts down to the left. Alternatively, if parental mental illness increases the marginal cost of schooling, the supply of schooling shifts up to the left. In either case, the optimal level of schooling decreases. 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.³

----- FIGURE 1 APPROXIMATELY HERE -----

We do not examine the exact process by which parental mental illness may cause a loss in children's schooling attainment. The children of parents with psychological disorders are already at a disadvantage because they inherit a genetic predisposition for mental illness.⁴ However, the results of psychological studies suggest that there may also be several factors associated with family environment that affect schooling attainment. Children with mentally ill parents have a higher probability of experiencing social isolation, economic stresses, low self-

³ We do not attempt to ascertain the underlying structural relationships and the impact of P and I on the rate of return to schooling.

⁴ We include direct controls for children's own experience with mental illness during adolescence to separate the effects of children's illnesses from parents' illnesses.

esteem, poor health status, and lack of adequate social supports. These negative factors may cause children to experience problems with schooling attainment as well as adult labor market performance.

4. Empirical methods

The data used in this study are drawn from the National Comorbidity Survey (NCS). The NCS was conducted between September 1990 and February 1992. The NCS 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 15 and 54 in the non-institutionalized civilian population of the United States. We use a sample of respondents who participated in psychiatric interviews and were old enough to have completed high school (19 to 54) at the time of the interview.⁵

Using the NCS data allows us to estimate empirical models that include sociodemographic variables, as well as variables that represent the parents' psychiatric disorders. The detail available in the data allows us to control for many of the confounding factors that may influence schooling attainment, so that we are able to identify the effects of parental mental illness on the survey respondent's schooling attainment.

Our measure of schooling attainment is a dummy variable indicating whether the individual dropped out of high school (DROPOUT). We use DROPOUT as the dependent variable in multivariate logistic analyses testing our hypothesis that parental mental illness is associated with a higher probability of dropout.⁶ The general specification for our logit analysis is

$$\text{DROPOUT} = f(\mathbf{C}, \mathbf{F}, \mathbf{E}, \mathbf{P}, \mathbf{I}) , \quad (3)$$

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

⁵ We exclude 44 respondents who reported that either their mother or their father abused illegal drugs from the sample. We drop this group because there were too few observations to conduct an analysis of the effects of drug abusing parents on children's schooling.

characteristics; P is a vector of variables representing parental mental illness; I is a vector of variables representing the person's own mental illness during schooling years; and E is a vector of variables representing other exogenous factors.

Women historically have lower high school dropout rates than men. This is typically attributed to the fewer opportunities available to women in the labor market. With fewer labor market opportunities, the opportunity cost of being in school is lower. Because of this fundamental difference, we analyze the dropout behavior of women and men separately. Definitions and descriptive statistics for the variables discussed below are presented in Table 1.

----- **TABLE 1 APPROXIMATELY HERE** -----

Parents mental illness (P). Our schooling model predicts that parental mental illness will be negatively associated with the respondent's schooling. To test this hypothesis, we use information in the NCS indicating whether each of the parents has a history of psychiatric disorders (major depression, anxiety disorder, alcohol abuse, drug dependence and/or abuse).

The respondent answered three questions describing whether depressive and anxiety disorders (a) interfered with the parent's life, (b) involved outpatient medical treatment of the parent, or (c) led to hospitalization of the parent. By using the first (most broadly defined) measure of these disorders, we ensure that our estimates are conservative. For example, our estimates of the negative impact of hospitalization for these two psychiatric disorders are larger in magnitude than those reported here. The questions pertaining to alcohol and drug dependence and/or abuse measures do not permit alternative specifications.

We examine two specifications of parental psychiatric disorders in our empirical analyses. First, we create dummy variables (HISTORY) for the mother and father that have a value of one if the respondent reported that parent as having any of the above mental disorders. Alternatively, we disaggregate HISTORY into two sets of four dummy variables representing particular psychiatric disorders. The disorders are depressive disorders (DEPRESS), nervous

⁶ High school dropout is defined as completing less than 12 years of schooling. The NCS data do not indicate whether an individual actually graduated from high school or obtained a graduate equivalency degree.

disorders (ANXIETY), alcohol dependence/abuse (ALCOHOL), and drug dependence/abuse (DRUG). Finally, because of the high prevalence of comorbid psychiatric disorders, we include several dummy variables that indicate whether a mother or father suffered from comorbid psychiatric disorders.⁷ These variables are listed and defined in Table 1.

Own mental illness (I). Episodes of mental illness during schooling years are presumed to have a negative impact on schooling attainment, other things equal. To control for mental illness during schooling years, we include a dummy variable (YOUTH DISORDER) in the analysis that indicates if the respondent reported the onset of any mental illness occurring before he or she reached 18 years of age.⁸

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. AGE is the person's age in years. It is a continuous variable with values between 19 and 54. We include AGE SQUARED to capture any nonlinear effects of AGE. Because the average years of schooling has increased over the last several decades in the United States, these variables are included to capture age cohort differences over time. Because schooling attainment has increased over the last several decades, so that older people are less likely to have completed high school, we expect to find a positive association between age and DROPOUT.

GOOD HEALTH is a dummy variable with a value of one if the respondent reports her or his health to be excellent, very good, or good and a value of zero if the respondent reports her

⁷ Comorbid psychiatric disorders' refers to two (or more) coexisting disorders.

⁸ 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).

In order to ensure that we do not confound the effects of parental mental illness with the effects of students' own mental illness, we also estimated our models on the subsample of individuals who do not report any mental illness during schooling years. This did not change any of the inference on the effects of parental mental illness on dropout obtained from the full sample. We conclude that controlling for the presence of own mental illness is sufficient to isolate the effects of parental mental illness, and use the full sample in all analyses reported here.

or his health to be poor. We expect better health to be negatively associated with DROPOUT, other things equal.

Several variables are included to control for differences in preferences due to cultural factors. Three dummy variables, PROTESTANT, OTHER RELIGIONS, and NO RELIGION, indicate a respondent's religion. The reference group includes respondents who indicate they are Catholic.

Two dummy variables, BLACK and OTHER RACES, represent race. The reference group comprises white respondents. Typically, studies have found less high school completion among non-white groups. Another variable, HISPANIC, is included to represent respondents who report that they are Hispanic. The reference group is non-Hispanics. ENGLISH SECOND is a dummy variable with a value of one if the respondent spoke a language other than English at home while a child.⁹ The reference group for this variable includes respondents who spoke only English. Because we include both HISPANIC and ENGLISH SECOND among our explanatory variables, the coefficient of HISPANIC represents a cultural effect rather than a language effect.

Family characteristics (F). To control for the effects of family income during schooling years, we include two dummy variables indicating if the respondent reported that his or her family was financially better off (BETTER THAN AVE) or worse off (WORSE THAN AVE) than the average family.¹⁰ The reference group for these variables includes respondents who indicated that their families were neither better off nor worse off than the average family.

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, we include two variables in our analysis. The first, INTACT FAMILY, is a dummy variable with a value of one if the respondent lived with both natural parents until at least age 15. We assume that having both natural parents present increased

⁹ There is evidence in the literature indicating that limited English proficiency is associated with high school dropout (U.S. Department of Education, 1990).

the time and effort devoted to the child's schooling. We therefore expect INTACT FAMILY to 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.

Our second variable, SIBLINGS, is the number of siblings in the respondent's childhood family. We assume that the greater the number of siblings, the less time and effort the parents have to invest in each on average.¹¹ Behrman and Taubman (1989) found that the number of siblings is negatively related to years of schooling. We also include a dummy variable, OLDEST, measuring whether a respondent was the oldest child in a multiple child household. We include this to determine whether dropout probability is affected by birth order.

Parents' educational attainment is included to reflect the parents' taste for schooling or their efficiency in the production of the household component of schooling. Many studies have found that parents' educational attainment is a highly significant factor influencing children's schooling attainment (see Behrman and Taubman (1989)). In our analysis, we include a variable termed EDUCATION OF FS to represent the years of schooling of the child's primary source of financial support.¹² We expect EDUCATION OF FS to be negatively associated with DROPOUT.

Schooling is a production process that can be derailed if a child's course of studies is interrupted frequently. We control for a lack of long-term stability by including a variable measuring the number of times the respondent's family moved during his or her schooling years (MOVES). We predict that higher mobility will be positively associated with DROPOUT.

¹⁰ Actual family income during the respondent's schooling years is not available in the NCS.

¹¹ Becker and Lewis (1973) and Becker and Tomes (1976) developed the theory describing the tradeoff between the quantity and quality of children.

¹² Ideally, we would include information on mother's and father's education separately. However, the NCS asks respondents only about the education of the person who was the principal financial support during childhood. 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.

Studies by Haveman and Wolfe (1994) and Astone and McLanahan (1994) found that residential mobility decreases schooling success.¹³

Finally, we included several 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, we 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, 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. We include the respondent's region of residence at the time of the survey (WEST, NORTHEAST, MIDWEST) to proxy for the region of residence during schooling years.¹⁴ The reference region is SOUTH.

Exogenous factors (E). Many empirical studies have reported a decrease in the rate of return to education in the 1970s followed by an increase in the 1980s.¹⁵ 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. Given a relatively stable demand for labor, the increased supply of labor resulted in higher unemployment and lower labor earnings. Higher unemployment and lower labor earnings may

¹³ 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.

¹⁴ The state or region of residence during the respondent's schooling years is not available. An examination of the study sample indicates that 49% of respondents have lived in the same state for their whole life and 72% of respondents live within 200 miles of the place where they were raised during most of their childhood. Consequently, we expect our regional variables to be reasonable proxies for the region of residence during childhood.

³ For women neither unemployment rate is significantly related to the probability of high school dropout. The dummy variable representing the impact of the military draft during the Vietnam War is included only in the specification (6) because it is not expected to affect the probability of dropout among women.

¹⁵ See, for example, Mincer (1993).

have significantly lowered the benefits of leaving high school and joining the full-time labor force.

During other periods, a tighter labor market increased the benefits of high school dropout. Empirical evidence supports this hypothesis. For example, Hill (1979) found that a higher demand for teenage labor increased the probability of dropping out of high school for both boys and girls.

To control for variations in the unemployment rate over time, we include two teenage unemployment variables, MAX UNEMPLOY RATE and MIN UNEMPLOY RATE, that represent the maximum and minimum national unemployment rates for 16 to 19 year olds during the three year period when the survey respondent was 16, 17, and 18 years old.¹⁶ We expect to find that a higher unemployment rate has a negative effect on high school dropout rates.

During the Vietnam War, young men had an incentive to stay in school to avoid the military draft. To capture the effect of the Vietnam War on schooling attainment, we include a dummy variable (VIETNAM WAR) with a value of one if the survey respondent was in high school during the Vietnam War military draft (1965 to 1974). We expect a negative association between DROPOUT and our dummy variable representing the war years.¹⁷

5. Results

In Table 1 we report variable definitions, as well as means and standard deviations, for the separate subsamples of women and men. The difference in DROPOUT between women and men is small, but as expected, the percentage of men who failed to complete 12 years of schooling is larger than the percentage of women. The differences between genders in the means of the family characteristics and exogenous factors are generally very small. Similarly,

¹⁶ Handbook of U.S. Labor Statistics (1998), pages 78-79.

¹⁷ There were also exogenous shocks to the demand for labor that may have contributed to the lower rate of productivity growth in the 1970s.

the percentage of women (33%) with a psychiatric disorder during schooling years is quite close to the percentage for men (35%).¹⁸

There are, however, some interesting differences between women and men in the extent to which they report that their parents suffered from psychiatric disorders. There is little apparent difference between women and men when we consider the mean of the consolidated measures of the father's psychiatric illness (HISTORY). The fathers of 29% of the women and 27% of the men in our sample had a psychiatric disorder that the survey respondent reported as interfering with life. However, the gap widens when we observe the means of the consolidated measure of the mother's psychiatric illness (HISTORY). While 22% of the women in the sample reported that their mothers had a psychiatric disorder, only 15% of the men reported that their mothers had a psychiatric disorder.

An explanation of these differences stems from the more easily recognized symptoms of alcoholism and the much higher prevalence of alcoholism among men. Because the manifestations of alcoholism are easily recognized, both men and women can reliably recognize and report this disease in their fathers. However, women's illnesses are less likely to be as overt. Consequently, there is more room for children to disagree about their mothers' mental health. That women systematically report higher levels of illness among mothers is consistent with the possibility that women are more aware of the manifestations of mental illnesses other than alcoholism. This may be because the prevalence of these diseases is higher among women (Kessler et al. (1994)), so they are more familiar with symptoms. Indeed, Kendler, Davis, and Kessler (1997) report that individuals who have psychiatric disorders are more sensitive to and more likely to report that disorder in their relative. Thus, men and women are more likely to

¹⁸ According to Table 1, 33% of women and 35% of men reported at least one psychiatric disorder before the age of 18 (YOUTH DISORDER). For women, the most common type of disorders were anxiety disorders (24%), with lower numbers of mood disorders (7.2%), alcohol dependence/abuse (6.5%), drug dependence/abuse (4.2%), and conduct disorders (5.0%). For men, the most common type of disorder was alcohol dependence/abuse (18%), followed by conduct disorders (15.2%), anxiety disorders (12.8%), drug dependence/abuse (8.0%), and mood disorders (3.5%). Comorbid psychiatric disorders are common, so that these categories are not mutually exclusive. See Kessler Foster, Saunders, and Stang (1995) for a description of psychiatric disorders in youth.

be in accord in reporting their fathers' alcoholism and less likely to be in accord in reporting other psychiatric illnesses more commonly found in their mothers.¹⁹

Because these reporting differences raise the possibility that parental mental illness is measured with error, especially for men, we urge the reader to interpret the results for men as tentative. Given the potential measurement problems, more definitive estimates will be possible only from analyses using different measures and data.

Table 2 provides an initial assessment of the relationship between high school dropout and parental psychiatric disorders for both men and women. We find that the dropout rate for both women and men whose father had a history of a psychiatric disorder is higher than for the children of fathers without a disorder (although the difference for women is only weakly significant). In comparison, for neither women nor men is there a statistically significant difference in the dropout rate associated with the mother having a history of a psychiatric disorder.

----- TABLE 2 APPROXIMATELY HERE -----

When we distinguish between various types of parental mental illness, a number of interesting relationships appear. Differences in dropout rates vary by disorder and by gender. In general, it appears that a woman is at higher risk of dropout if either her mother or father is ill. Dropout rates among women tend to be higher if either parent had an alcohol or anxiety disorder. The results are less consistent for men. A man's probability of dropout is positively related to his mother's depression and anxiety disorders and to his father's alcohol disorder.

Tables 3a and 3b report results of our weighted logistic analyses of high school dropout. In Table 3a we report the marginal effects of the control variables used in our analyses. Although we present the results for six specifications in Tables 3b, only the marginal effects for the control variables in the complete specification are reported in Table 3a.²⁰

----- TABLES 3A AND 3B APPROXIMATELY HERE -----

¹⁹ We are grateful to an anonymous referee for discussion of this point.

²⁰ The marginal effects of the control variables are very similar across all the specifications, so we report them only once.

Comparing the results of six alternative specifications in Table 3b allows us to check the robustness of our results to changes in the specification. Specifications (1) and (4) include the control variables and the dummy variables indicating a history of mother's or father's psychiatric disorder separately for women and men. In specifications (2) and (5), the parental psychiatric history dummy variables are replaced with the set of dummy variables representing whether the mother or father had specific disorders. In specifications (3) and (6), this set of variables is retained and the set of comorbidity variables is added.

The results presented in Table 3a indicate that many of the control variables have the expected effect on the probability of high school dropout. Among the individual characteristics, we find that good or excellent (self-reported) health is associated with a lower high school dropout probability rate for both women and men.²¹ As expected, reporting a psychiatric disorder prior to 18 years of age significantly increases the probability of dropout for both men and women.

For women, the probability of dropout is negatively related to age but positively related to the square of age. For teenagers attending high school, the latter effect dominates, so that the net impact of increasing age is a higher probability of dropout.²² A similar pattern of signs of the age variables is observed for men, but neither of the age variables is statistically significant.

Several of the cultural control variables are significantly related to the probability of dropout. Consistent with previous findings, blacks have consistently lower rates of high school dropout for women across all three specifications and being Hispanic is associated with a higher high school dropout rate for women in at least one specification.²³ For men, being black does not lead to a statistically significant difference in the probability of dropout, other things equal. However, being neither black nor white, (having a value of one for OTHER RACES) significantly reduces the probability of dropout among men.

²¹ The data does not include a general health indicator for school age years. Self-reported adult health (GOOD HEALTH) is included as a proxy variable. Dropping GOOD HEALTH has no impact on the other coefficient estimates.

²² The derivative of the dropout function with respect to age is $-0.010 + 0.001 \text{ AGE}$. The minimum of the function occurs at age 10 and for all teenage years, the net impact is positive.

As predicted, the greater the number of years of schooling of the individual's primary financial supporter, the lower is the probability of the child dropping out of high school. Other things equal, being the oldest sibling and having fewer siblings also lowers the probability of high school dropout. For men, the probability of dropout increases with the number of moves made during childhood, although the magnitude of the marginal effect is less than 0.01. For women, reporting that family income during childhood was worse than average is associated with a lower probability of dropout (for $\forall = .10$). Finally, the maximum national unemployment rate that occurred during a man's high school years is inversely related to his probability of dropout (for $\forall = .10$).

In Table 3b, we present parameter estimates of our models of parental psychiatric disorders on high school dropout and the marginal effects of significant variables. Columns (1) and (4) present estimates from the simplest specification, in which mothers' and fathers' histories of any mental illness is measured in dummy variable form. The estimates of column (4) mirror those of Jayakody et al. (1998), who found no significant effect of parental mental illness on boys' educational attainment. Similarly, in column (1), we do not find a significant effect of parental psychiatric disorder on girls' probability of dropout.

In specifications (2) and (5), we replace the parental history variables with the dummy variables representing particular parental psychiatric disorders. Distinguishing between types of parental mental illness in this manner reveals that several of the specific disorders significantly increase the likelihood of high school dropout for both women and men. Specifically, we find that a father's anxiety increases his daughter's probability of dropout. A mother's alcohol dependence or abuse increases a daughter's probability of dropout, while a mother's anxiety disorder increases a son's probability of dropout. Interestingly, we also observe that a father's depression is significantly associated with a lower probability of dropout for his daughter(s) and a father's anxiety disorder is significantly associated with a lower probability of dropout for his

²³ Haveman and Wolfe (1995).

son(s). These negative effects on dropout appear to offset the positive effects so that the marginal effects of the history indicators in specifications (1) and (4) do not differ significantly from zero.

Because comorbid psychiatric disorders are common, the final specifications in Table 3b include variables representing several comorbid disorders. The findings in column (3) indicate that women with mothers suffering from depression have a higher probability of dropout than women whose mothers did not have depressive disorders. In addition, the effect observed in specification (2) for women of having a mother with an alcohol disorder is more appropriately identified as the effect of comorbid alcohol and anxiety disorders: Women whose mothers have comorbid anxiety and alcohol disorders also have a higher probability of dropout than women whose mothers do not have these disorders. The negative association between father's depression and women' dropout observed in specification (2) is stronger in specification (3). However, the significant positive effect of having a father with an anxiety disorder on a daughter's probability of high school dropout is not statistically significant in the fullest specification.

For men, the estimates of column (6) indicate that there are no significant effects of parental mental illness on high school dropout. Neither the impact on the son's probability of dropout of the mother's anxiety disorder nor that of the father's anxiety disorder, both observed in specification (5), is statistically significant in the fullest specification.

Taken as a group, the results of each of the various specifications suggest differential effects of parental mental disorders on children's likelihood of dropping out of high school. In general, it appears that psychiatric disorders among mothers have more substantial negative effects, and that girls are more negatively affected than boys.

We also attempted to estimate models that analyze the effect of mentally ill parents on high school dropout by race. Because blacks suffer from mental illness at a higher rate than whites, black children are more likely to be exposed to parental mental illness [Vega and

Rumbaut (1991)] and black students are more likely to drop out of high school than comparable whites. Unfortunately, small cell sizes precluded us from estimating models reported in Table 3b for non-whites. We were able to estimate these for the subsample of white respondents and found that the negative effects of mothers' psychiatric illness, especially alcohol and depression, were more severe for the subsample of white women than in the full sample of all women.

6. Conclusions

Using a sample drawn from the National Comorbidity Survey, we find evidence suggesting that parents' mental illness can increase the likelihood of a child dropping out of high school. First, in our bivariate analyses, we find consistently higher rates of high school dropout for children whose parents suffer from substance or non-substance abuse mental illnesses.

Second, in our multivariate models we find that some parental mental illnesses increase dropout risk, but the magnitude, significance, and direction of these effects depends on the type of illness and the gender of the child. We find that women are more likely to drop out of high school if their mothers have depression or abuse alcohol, especially if abuse is comorbid with anxiety disorders. Interestingly, we also find that having a father with a depressive illness decreases the probability of high school dropout for women. For men, we generally find fewer effects of parental mental illness on high school completion. We find that for men the risk of high school dropout increases only with the presence of a mother suffering from anxiety disorders. Overall, we find that mental illness among mothers has more substantial negative effects on children than mental illness among fathers, and that girls are more negatively affected than boys.

The relative importance of mothers' mental health on children's schooling is interesting. This suggests that mothers play a more important role than fathers in shaping children's schooling attainment. Mental illness among mothers is likely to impair the ability of mothers to carry out their normal responsibilities. For example, illnesses such as alcoholism or depression are likely to limit a mother's ability to monitor, guide or advise her children, or serve as a role

model. At the same time, mental illnesses among mothers may result in more substantial burdens on children if they are called on to perform duties that a healthy mother might otherwise perform. This added responsibility may lead a child to subsequently withdraw from school.

The relatively strong effect of mothers' disorders on daughters is interesting, too. It suggests that to the extent that mental illness precludes a mother from adequately fulfilling her traditional family obligations, daughters may be more likely to fill in. Alternatively, if the negative effects of mothers' illnesses on children are due to her importance as a role model or counselor, the stronger impacts on girls suggests that daughters rely more on mothers as models and for support than do sons.

We believe that these findings are an important contribution to our understanding of the determinants of schooling attainment and of the consequences of mental illness. We view these findings as a starting place for further research into the impact of psychiatric disorders within the family and on human capital formation of family members. Our results make it clear that mental illness should be analyzed as having effects on families, not just on ill individuals. Mental illness shapes the prospects of both the ill and family members even as they establish lives for themselves outside the social and economic sphere of their families. These impacts of parents' mental illness on children have important policy implications. Policy initiatives designed to treat mental illnesses and provide support to 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 the ill.

Acknowledgements

This research was supported through a grant from the National Institute for Mental Health (R01-MH56463-01). The authors thank Peter Orazem, Judy Temple, and Susan Porter-Hudak for helpful comments.

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