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7 Employment, Earnings, and Psychiatric Diagnosis

Lee and Alexandra Benham

Why some individuals earn more and why some work more than others are concerns of long standing in economics. In recent years several studies have shown both earnings and labor force participation to be importantly related to health status. With few exceptions, these studies have concentrated almost exclusively on physical health status, giving little direct attention to mental disorders.[1] However, mental disorders affect a substantial proportion of the population: between 10% and 15% of the population have clinically significant psychiatric disorders, and many more suffer from milder disturbances (Woodruff, Goodwin, and Guze 1974, p. 197). This study offers some estimates of the relationships between earnings, employment status, and psychiatric diagnosis.

We are able to undertake this analysis because a remarkable data file has been made available by Lee Robins of the Department of Psychiatry, Washington University, a file originally collected for her classic study of the sociopathic personality, *Deviant Children Grown Up*. It contains detailed sociodemographic and psychiatric information for a sample of individuals born in St. Louis in the 1910s and 1920s, referred to a child guidance clinic during the period 1924–29 or selected as control subjects, and followed up thirty years later. This file permits examination of a wide variety of issues of interest to economists. Integrating mental disorders into a fully articulated model of labor market behavior is not our objective in this, our initial examination of these data. Rather it is to provide descriptive information which links specific psychiatric diagnoses with labor market behavior and to suggest the potential for expanding our

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understanding of some relationships which have been previously established in the economic literature.

Background

The data file utilized in this paper was originally collected by Lee Robins to study "through a longitudinal investigation the natural history of the psychiatric syndrome variously called sociopathic personality, antisocial reaction, psychopathic personality, and in more venerable days, moral imbecility or constitutional psychopathic inferiority" (Robins 1966, p. 1).

The major part of this sample consists of individuals who were patients at a child guidance clinic, the St. Louis Municipal Psychiatric Clinic, between 1 January 1924 and 30 December 1929, and who were white, were under the age of 18 at the time of referral, and had IQ's of 80 or higher.[2] In Robins' study, 524 individuals, henceforth called clinic patients, met these criteria. Robins also used St. Louis elementary school records to obtain a sample of 100 controls matched by year of birth, by sex, and by average monthly rental in census tract. The controls had to have IQ's of at least 80, to be white, to have attended St. Louis elementary schools for at least two years, and to have no record of school failure, school expulsion, or transfer to a correctional institution while in elementary school. The present analysis utilizes the male subsample of this study population. It consists of 434 males, of whom 365 were clinic patients and 69 were controls.

A substantial amount of information on the clinic patients had been systematically collected by the St. Louis Municipal Psychiatric Clinic in the 1920s, including social history, medical examination, and psychological tests. Robins located the clinic patients approximately thirty years after the referral date and the controls approximately thirty years after their graduation from elementary school. An extensive personal interview was then conducted with all individuals who were located. The interview data were supplemented by information from relatives, police files, school records, army records, credit bureaus, medical and mental hospitals, welfare agencies, and coroner's records, among others. Information was collected on a wide variety of variables, including those conventionally used in economic analysis: employment status, weekly earnings, years of schooling, marital status, and physical health status. In addition, psychiatric diagnoses were made. A major effort was made to collect information for every individual: interviews were undertaken and records were collected from all parts of the country. Of the individuals in the sample, 90% were located or were found to have died; adult records were found for 98%; interviews were obtained for 82% of those not

known to have died before age 25. The exhaustiveness of this data collection process is impressive.[3]

Diagnostic Categories

Central to the analysis in this paper are the psychiatric diagnoses used to classify members of the sample. Given the unfamiliarity of these categories to most economists, some discussion of these concepts is warranted.

The notion of psychiatric disease itself is not universally accepted, and considerable confusion and skepticism exist concerning the meaning of particular psychiatric diagnoses. One reason for the skepticism is that in psychiatry, diagnosis usually depends upon what people say in the absence of laboratory tests to confirm the diagnoses.[4] Another reason has been the lack of clearly defined criteria to be used in making differential diagnoses and the absence of replicability.

An approach to these issues which we have found illuminating is that articulated by Woodruff, Goodwin, and Guze in their book, *Psychiatric Diagnosis*. In their view, a disease (including psychiatric disease) is "a cluster of symptoms and/or signs with a more or less predictable course. . . . It is a useful category if precise and if the encompassed phenomena are stable over time" (Woodruff, Goodwin, and Guze 1974, pp. x–xi). This emphasis on classifying by means of patterns of symptoms according to strict criteria and on forecasting future outcomes is an approach followed by an increasing proportion of investigators in psychiatry. The absence of laboratory signs does not preclude diagnostic categories from attaining a high degree of reliability and power to predict the course of the disease over time. The efforts being undertaken in this area by psychiatrists and epidemiologists are impressive and provide a basis for further investigation of a variety of labor market phenomena.[5]

It should be emphasized that psychiatric disorders are of interest to economists not only because scientific standards are being applied in the collection and evaluation of relevant data but also because these diseases have real and significant consequences: "they result in consultation with a physician and are associated with pain, suffering, disability, and death" (Woodruff, Goodwin, and Guze 1974, p. xi). The subsequent analysis here will indicate in summary fashion some of the economic phenomena associated with various psychiatric disorders.

In Robins' study, diagnoses were assigned on the basis of criteria for sociopathy developed by Robins and criteria for other disorders derived from *The Diagnostic and Statistical Manual, Mental Disorders, 1952,* and from various clinical follow-up studies.[6] To assign psychiatric diagnoses to the individuals in the sample, the standard life history for each subject,

supplemented by record information, was evaluated independently by two psychiatrists. Diagnoses were based only on information pertaining to the subject's life history after age 18. The subject was assigned a diagnostic category if he met the established criteria at any period in his life after age 18. The diagnoses therefore refer to the occurrence of psychiatric disease in the individuals during a period of approximately twenty-five years (age 18 to age 43, the average age at follow-up).

Criteria for making diagnoses from interviews were established through independent diagnoses by three psychiatrists of the first 150 cases interviewed and subsequent discussion of the reasons for their decisions. For the remaining cases, each of two psychiatrists initially assigned a diagnosis based on the interview alone. After a time lapse of a year or more, two psychiatrists independently reviewed a summary chart of all record information obtained on the individual (e.g., police, credit, housing, military, and mental hospitalization records), the records themselves, the initial diagnosis, and the interview. They then made a final diagnosis, estimated the severity of the illness, and summarized consistency of symptom patterns over time. Cases on which there was disagreement were subsequently reviewed jointly to reach consensus.

Following are the names and brief descriptions of the principal psychiatric disorders coded in this study, and where available, estimates of their lifetime prevalence rates.[7]

WELL: "A subject was called 'no psychiatric disease' only when he did not have at follow-up and had never had more than three symptoms which appeared to be of psychiatric significance (e.g., complaints of tension, emotional lability, vague somatic symptoms without diagnosable medical disease) or even one psychiatric symptom sufficiently disabling to cause him to seek medical help" (Robins 1966, p. 82).

PSYCHOSIS: Included in this diagnostic category are schizophrenia and affective disorders. Schizophrenia is "characterized by fundamental disturbances in reality relationships and concept formations, with affective, behavioral, and intellectual disturbances" (American Psychiatric Association 1952, p. 26). Common features are delusions and hallucinations, strikingly inappropriate affect, unusual motor behavior, and disordered thinking. Affective disorders (depressive and manic-depressive) are defined by a "primary, severe, disorder of mood, with resultant disturbance of thought and behavior" (American Psychiatric Association 1952, p. 24). Organic brain syndrome, characterized by "diffuse impairment of brain tissue function" and entailing impairment of orientation, memory, all intellectual functions, judgment, and affect, was also coded in this category (American Psychiatric Association 1952, p. 14). Schizophrenia is estimated to affect 1–2% of the population. Estimates of the prevalence of affective disorders vary widely; some studies estimate 5%

of men and 9% of women are likely to have primary affective disorders at some time.

SOCIOPATHY: "The term sociopathic personality is used in this study to mean a syndrome characterized by *a gross, repetitive failure to conform to societal norms in many areas of life, in the absence of thought disturbance suggesting psychosis.* . . . The criteria for the diagnosis of sociopathic personality were developed before designing the interview. For each of 19 areas of the subject's life in which he might fail to conform to societal norms, specific criteria for 'failure to conform' were set up. It was decided, *a priori*, that these criteria must be met in at least five life areas before a diagnosis of sociopathic personality could be *considered.* But a diagnosis of sociopathic personality was not made mandatory, no matter how many of the criteria had been fulfilled.

"The symptom areas used to diagnose sociopathic personality were: work history, marital history, drug use, alcohol use, arrests, belligerency, sexual behavior, suicide attempts, impulsiveness, truancy combined with other school problems, financial dependency, performance in the Armed Forces, vagrancy, somatic complaints, pathological lying, [failure to maintain] social relationships, use of aliases, lack of guilt, and 'wild' behavior in late adolescence. All but one of these, truancy, referred only to behavior after age 18. . . . The median number of areas in which subjects given a final diagnosis of sociopathic personality met the criteria for disturbed behavior was 11. Only 6% had symptoms only in the minimum five areas" (Robins 1966, pp. 79–80). Estimates of the prevalence of sociopathy in the population vary widely. Indirect estimates suggest that it is common.

ALCOHOLISM: "This study defined alcoholics as persons with 'well-established addiction to alcohol *without recognizable underlying disorder.*' Sociopaths, schizophrenics, and other psychotics who were addicted to alcohol were excluded from this category. Subjects were *not* excluded, however, if they simultaneously had neurotic symptoms and were addicted to alcohol" (Robins 1966, p. 244). The lifelong expectancy rate for alcoholism among men is about 3–5%; for women, about .1–1%.

NEUROSIS: "The chief characteristic of these disorders is 'anxiety'. . . . In contrast to those with psychoses, patients with psychoneurotic disorders do not exhibit gross distortion or falsification of external reality (delusions, hallucinations, illusions) and they do not present gross disorganization of the personality. Longitudinal (lifelong) studies of individuals with such disorders usually present evidence of periodic or constant maladjustment of varying degree from early life. Special stress may bring about acute symptomatic expression of such disorders" (American Psychiatric Association 1952, p. 31). Symptoms associated with anxiety neurosis include dizzy spells, dyspnea, palpita-

tions, chest pain, anxiety attacks, anxiety in crowds, nervousness, and weak feelings. Approximately 5% of the adult population is affected by anxiety neurosis.

UNDIAGNOSED BUT SICK: "Undiagnosed but psychiatrically ill" was assigned when the individual appeared to be psychiatrically ill but it was not possible to make a specific diagnosis (Robins 1966, p. 76).

NO ESTIMATE: "No estimate as to whether well or sick" was assigned when no decision could be reached as to whether the individual was psychiatrically ill or well. Most of the individuals receiving this diagnosis were not personally interviewed at follow-up, e.g., were among the missing or dead. (Robins 1966, pp. 76–77).

Empirical Estimates

Some relationships between psychiatric status and earnings, employment status, and the principal economic variables used to explain them are explored below, using calculations of means and simple multivariate equations. No attempt is made in this paper to impose a fully specified model on the data.

Table 7.1 shows cross-tabulations of employment status and earnings by psychiatric diagnosis. It is worth emphasizing that individuals were assigned a diagnostic category if they *ever* fulfilled the criteria for the diagnosis after age 18. If the disease was in remission at the time of follow-up, they are still included under the diagnosis. These results thus are likely to understate the effects for those whose disease was active at the time of follow-up. Several of the differences are substantial, and diagnoses associated with low wage rates are also associated with low employment rates. It is of some interest that those diagnosed as well have neither the highest earnings nor the highest rate of employment: that distinction belongs to the neurotics.

Column 5 of Table 7.1 shows educational attainment, a variable which is almost universally included in earnings functions. A vast theoretical and empirical literature exists on the relationship between educational attainment and earnings. Why some individuals obtain more education than others has been much less frequently explored, but several studies indicate a strong familial pattern both for educational attainment and for earnings level (Taubman 1976; Jencks 1979). Education varies with psychiatric diagnosis in this sample. Since each of the psychiatric diseases coded here tends to be more prevalent among first-degree relatives of persons diagnosed as having that disease, these results suggest one of the mechanisms which may underlie familial patterns of educational attainment and of economic success.[8]

Marital status is of interest in this context because of the well-established relationship between marital status and labor force participa-

Table 7.1 **Earnings, Employment, IQ, and Education by Psychiatric Diagnosis**

Psychiatric Diagnosis	Weekly Earnings, in Dollars[a]			Employed Full Time		Employed Full or Part Time or in Armed Services		IQ Category[b]			Years of Schooling		
	Mean	SD	N[c]	%	N[c]	%	N[c]	Mean	SD	N[c]	Mean	SD	N[c]
Entire sample	116.44	56.52	283	78	361	84	361	2.35	1.24	413	9.82	3.16	358
Well	118.97	51.09	94	90	110	95	110	2.49	1.23	99	11.10	3.07	110
Psychosis	82.61	60.23	23	57	37	62	37	2.00	1.10	41	8.27	2.98	37
Sociopathy	102.91	47.73	48	56	68	66	68	2.17	1.17	81	8.22	2.45	68
Alcoholism	99.29	52.79	26	79	29	86	29	2.13	1.09	31	8.45	2.05	29
Neurosis	144.50	58.94	44	96	46	98	46	2.90	1.39	42	12.03	3.11	46
No diagnosis, but sick	121.66	57.75	41	84	56	88	56	2.21	1.15	71	9.12	2.62	55
No estimate	143.21	75.93	7	73	15	87	15	2.50	1.41	48	10.08	3.51	13
Severe psychiatric disease, ever	103.81	53.17	101	66	137	72	137	2.18	1.16	146	8.56	2.71	136

[a]For persons with known positive earnings.
[b]IQ categories: 1 = 80–89 IQ
2 = 90–99 IQ
3 = 100–109 IQ
4 = 110–119 IQ
5 = 120 + IQ.

[c]Number of nonmissing observations for this category.

tion, and between marital status and health. Marital status is the single most important variable in "explaining" labor force participation of mature men.[9] A substantial literature exists on the economics of the family, but persuasive evidence is sparse on the reasons why the labor force participation of unmarried men is low and why they are less healthy.[10] In Table 7.2 the differences in marital status by psychiatric diagnosis are large.

The question naturally arises as to whether the result observed for sociopaths simply reflects the inclusion of marital instability among the criteria used in their classification. Those who were classified as sociopaths in the sample we investigated had on average 10.0 antisocial criteria, of which one at most could have been marital status. (Individuals classified as well had on average 1.1 antisocial criteria.) Thus, sociopaths engaged in a wide variety of antisocial acts, and their classification would not have been significantly changed if marital status had been excluded as a diagnostic criterion. Furthermore, as noted below, the onset of antisocial behavior almost invariably predates the age of marriage. These results suggest one of the reasons for the low labor force participation among those not married: psychiatric disorders are highly correlated with reduced market activity and with worse marital circumstances.

The principal variable used in relating health status to economic behavior in most economic studies has been the individual's response to questions of the form, "Is your health excellent, good, fair, or poor?" The subjects in Robins' study were classified at the time of follow-up as in good, fair, or poor self-reported general health status (if still alive and located).. The distribution of persons across these three categories by psychiatric diagnosis is shown in Table 7.3. Persons who were in poor mental health were on average in poorer physical health and had higher death rates.[11]

Table 7.2 Marital Status by Psychiatric Diagnosis

Psychiatric Diagnosis	Married and Together	Separated, Widowed, Divorced	Always Single	N[a]
Entire sample	72%	15%	13%	400
Well	90	5	5	110
Psychosis	44	12	44	41
Sociopathy	53	39	8	72
Alcoholism	65	23	13	31
Neurosis	80	11	9	46
No diagnosis, but sick	77	14	9	66
No estimate	76	6	18	34
Severe psychiatric disease, ever	58	25	17	141

[a]Number of nonmissing observations for this category.

Table 7.3 Current Health Status by Psychiatric Diagnosis

Psychiatric Diagnosis	Alive and Health Good	Alive and Health Fair	Alive and Health Poor	Dead	Not Located for Follow-up	N[a]
Entire sample	62%	9%	2%	10%	16%	434
Well	89	3	1	7	0	110
Psychosis	55	14	7	5	19	42
Sociopathy	50	12	4	16	18	82
Alcoholism	71	6	0	19	3	31
Neurosis	78	20	0	2	0	46
No diagnosis, but sick	50	14	4	12	20	74
No estimate	24	0	0	12	63	49
Severe psychiatric disease, ever	61	15	5	11	9	148

[a]Total number of observations for this category.

Table 7.4 estimates some multivariate relationships with weekly earnings for employed individuals as the dependent variable. The sample is restricted to those who were alive at the time of follow-up and were employed, with known education, marital status, and earnings. Among these persons, neurotics earned approximately 23% more than those classified as well, and psychotics earned approximately 43% less. The impact of psychiatric diagnosis is altered only slightly when measures of physical health status are introduced.

The marital status variable has the expected positive association with earnings, although this association is somewhat diminished when psychiatric diagnosis is included. Neurosis and psychosis continue to have a significant independent effect in this specification. If anything in Table 7.4 is a surprise, it is the absence of statistically significant differences for the sociopaths, the alcoholics, and the undiagnosed but sick, as compared to the well.

The coefficient of the variable "years of schooling" approximates the rate of return to education, here estimated as 5.8%. The inclusion of variables for experience does not alter the education coefficient, and the experience variables themselves are statistically insignificant. The coefficients of neurosis and psychosis are diminished somewhat when education is included.

The child guidance clinic patients were not a random sample of the population of boys in St. Louis in the 1920s. A large proportion of the clinic patients were having some trouble in school at the time of referral to the clinic, and the overall level of school achievement and attainment for this group was low. That fact alone would lead us to expect low earnings for this group. What is more interesting is the question of the

Table 7.4 **LN Weekly Earnings as a Function of Psychiatric Diagnosis and Other Variables[a]**

Independent Variables	Regressions					
	1	2	3	4	5	6
Psychiatric Diagnosis[b]						
Psychosis	−.430	−.396	−.310		−.353	−.390
	(3.8)	(3.4)	(2.9)		(3.0)	(3.4)
Sociopathy	−.033	−.004	.144		.014	−.017
	(.4)	(.05)	(1.7)		(.2)	(.2)
Alcoholism	−.112	−.101	.047		−.076	−.087
	(1.1)	(1.0)	(.5)		(.7)	(.8)
Neurosis	.226	.256	.177		.271	.240
	(2.9)	(3.2)	(2.4)		(3.4)	(3.0)
No diagnosis, but sick	.063	.071	.135		.085	.075
	(.7)	(.8)	(1.7)		(1.0)	(.9)
No estimate	.145	.139	.290		.224	.229
	(.7)	(.7)	(1.6)		(1.1)	(1.1)
Other Variables						
Physical health fair[c]		−.170	−.131		−.176	
		(2.0)	(1.7)		(2.1)	
Physical health poor[c]		.181	.236		.151	
		(.8)	(1.2)		(.7)	
Married with spouse present				.143	.116	.115
				(1.9)	(1.5)	(1.5)
Years of schooling			.058			
			(6.7)			
Constant	4.693	4.698	4.062	4.583	4.590	4.585
	(103.9)	(104.5)	(39.5)	(68.1)	(55.2)	(55.0)
R^2	.12	.14	.28	.02	.15	.13

[a]OLS regressions for the subsample of 244 males who were still alive at follow-up, were employed full or part time or were serving in the armed forces, and had known positive earnings, known education, and known marital status. *t*-statistics appear in parentheses.
[b]The excluded dummy variable for this set is "well".
[c]The excluded dummy variable for this set is "physical health good".

rates of return to schooling for these clinic patients. As discussed earlier, controls were matched with the clinic patients by a variety of characteristics, but the controls differed in the important respect that no information suggested they engaged in antisocial behavior in elementary school. It is of interest to note that (in specifications not shown here) the rates of return to education do not differ significantly between the clinic patients and the controls, and there is no significant interaction between control status and education.

In Table 7.5 measures of IQ are included in the regressions. IQ has a strong independent impact on earnings, and when it is included, the estimated rate of return to education falls to 4.5%. The impact on earnings of neurosis and psychosis remains significant.

Table 7.6 shows some regression estimates for employment status. In this case, the sample is composed of all individuals who were alive at the time of follow-up with known employment status, education, and marital status. Individuals were counted as employed if working full or part time or serving in the army. The results indicate that psychotics and sociopaths were significantly less likely to be employed. As expected, individuals in poor physical health were also significantly less likely to be employed, but including physical health status in the specifications alters the psychiatric coefficients only trivially.

It will be noted that the variables given most theoretical attention, wages and income, are not included in these employment equations directly. These are ignored for two reasons. First, the literature seems fairly consistent in indicating the relative unimportance of these effects for men of this age; hence it appears unlikely that conventionally measured income and substitution effects would alter the partial estimates of psychiatric diagnosis. Second, we do not have meaningful income and wage rates for those not employed. Education can be interpreted in part as a proxy for lifetime wealth.

Many studies have found marital status to be significantly related to employment status. In this sample, unmarried men had an employment rate of 70% whereas those married had an employment rate of 94%. When psychiatric status and marital status are considered simultaneously, the effects of both on employment are diminished. Part of the relationship between marital status and labor force participation heretofore observed may be bound up with psychiatric disorder. This does not answer the question of the extent to which marriage is a cause or an effect, but for some disorders, such as antisocial personality, the symptoms usually begin prior to the age of marriage. Indeed, in Robins' study, there were no cases of men who were diagnosed as adult sociopaths who did not display sociopathic tendencies prior to age 16. In the case of psychotics, many never married. Certainly for those cases it cannot be argued that marital breakup precipitated psychiatric disorder.

The psychiatric diagnoses discussed above are one way to characterize the mental health of individuals. Many studies have used rates of admission to mental hospitals to examine the relationship between mental health and socioeconomic status or other characteristics of interest. While the rate of admission to mental hospitals is a less refined measure, it is a much more commonly available one. For some purposes (obviously not including an examination of the demand for medical services) the number of times an individual has been hospitalized can be used as a proxy for health status.

Table 7.5 **LN Weekly Earnings as a Function of Psychiatric Diagnosis, IQ, and Other Variables[a]**

Independent Variables	Regressions 1	2	3
Psychiatric Diagnosis[b]			
Psychosis	−.347	−.301	−.252
	(3.2)	(2.9)	(2.4)
Sociopathy	.012	.126	.146
	(.2)	(1.5)	(1.8)
Alcoholism	−.065	.049	.081
	(.7)	(.5)	(.8)
Neurosis	.172	.142	.156
	(2.3)	(1.9)	(2.2)
No diagnosis, but sick	.087	.144	.160
	(1.1)	(1.8)	(2.0)
No estimate	.169	.280	.382
	(.9)	(1.6)	(2.1)
Other Variables			
IQ 90–99[c]	.170	.105	.101
	(2.4)	(1.5)	(1.5)
IQ 100–109[c]	.222	.111	.104
	(2.9)	(1.4)	(1.4)
IQ 110–119[c]	.370	.238	.239
	(3.9)	(2.5)	(2.5)
IQ 120 or over[c]	.533	.294	.299
	(5.1)	(2.6)	(2.7)
IQ missing[c]	.446	.354	.351
	(3.7)	(3.0)	(2.8)
Married with spouse present			.141
			(2.1)
Years of schooling		.045	.046
		(4.7)	(4.8)
Constant	4.476	4.062	3.923
	(70.2)	(37.8)	(31.1)
R^2	.24	.31	.32

[a]OLS regressions for the subsample of 244 males who were still alive at follow-up, were employed full or part time or were serving in the armed forces, and had known positive earnings, known education, and known marital status. *t*-statistics appear in parentheses.
[b]The excluded dummy variable for this set is "well".
[c]The excluded dummy variable for this set is "IQ 80–89."

Table 7.6 **Employment in the Labor Force as a Function of Psychiatric Diagnosis and Other Variables[a]**

Independent Variables	Regressions				
	1	2	3	4	5
Psychiatric Diagnosis[b]					
Psychosis	−.293	−.273	−.182	−.271	−.164
	(4.8)	(4.4)	(2.9)	(4.3)	(2.6)
Sociopathy	−.304	−.297	−.236	−.278	−.214
	(6.1)	(5.9)	(4.7)	(5.3)	(4.1)
Alcoholism	−.012	−.018	.030	.011	.050
	(.2)	(.3)	(.5)	(.2)	(.8)
Neurosis	.007	−.005	.016	−.003	.006
	(.1)	(.1)	(.3)	(.1)	(.1)
No diagnosis, but sick	−.032	−.031	.0004	−.015	.014
	(.6)	(.6)	(.008)	(.3)	(.3)
No estimate	−.082	−.083	.004	−.069	.016
	(.8)	(.8)	(.04)	(.7)	(.2)
Other Variables					
Physical health fair[c]		.053	.041		.046
		(1.0)	(.8)		(.9)
Physical health poor[c]		−.331	−.362		−.348
		(3.3)	(3.7)		(3.5)
Married with spouse present			.181		.181
			(4.5)		(4.5)
Years of schooling				.009	.008
				(1.6)	(1.5)
Constant	.971	.972	.805	.868	.713
	(32.9)	(33.4)	(17.1)	(12.3)	(9.1)
R^2	.16	.20	.24	.17	.25

[a]OLS regressions for the subsample of 314 males who were still alive at follow-up and had known employment status, known education, and known marital status. Individuals who were employed full or part time or who were serving in the armed forces are counted here as employed in the labor force; the remainder are counted as unemployed. *t*-statistics appear in parentheses.

OLS estimates are reported here for ease of interpretation. Logit estimates (when transformed) give results very similar to those shown: the same set of variables is significant, and in only one case (physical health poor) does the transformed coefficient of a significant variable differ more than .02.

[b]The excluded dummy variable for this set is "well".

[c]The excluded dummy variable for this set is "physical health good".

Table 7.7 shows patterns of hospitalization by psychiatric diagnosis. There are differences in the use of medical hospital services by diagnosis, but these are relatively small compared to the differences in the use of mental hospital services. Individuals diagnosed as psychotic or sociopathic used on average substantially more mental hospital services than those diagnosed as well.[12] Psychotics make up a high proportion of the long term patients in mental hospitals, so the large number of years spent in mental hospitals by this group is not surprising.[13]

From Table 7.8 it can be seen that the mean characteristics of individuals who were in the labor market full time differed substantially from the mean characteristics of those who were not. Among the characteristics of interest in this table are the variables related to medical and mental hospitalization. Medical hospitalization appears to be similar for all groups except those not located for follow-up, for which the number of nonmissing observations is small. This is in contrast to mental hospitalizations. For those males fully employed, there was only one mental hospital admission for every five individuals over their lives up to the time of the follow-up. The mean stay per admission was ten weeks. Simple calculations indicate that for those males not fully employed, which includes those who were institutionalized at the time they were surveyed, the mean number of admissions per individual was 1.08 and the mean stay per admission was 1.26 years. Compared to those who were fully employed, those not fully employed had over five times as many admissions and six times as long a stay per admission in mental hospitals. The impact of psychiatric disease in this sample is heavily concentrated among the unemployed and those out of the labor force.

Conclusion

Our objective in this paper has been to illustrate the strong association between psychiatric diagnoses, earnings, and employment status. Part of our motivation for studying the effects of mental disorders is an interest in the question of why some individuals have very low earnings. We have not attempted here to specify the direction of causality or the nature of the structural relationships among the variables, but one of our ultimate objectives is to see how well we can predict who will be in the lower tail of the permanent income distribution.

One would expect health status to play a major role in determining who ends up on the bottom of the income distribution. What is particularly intriguing about mental disorders in this context is that some disorders, including antisocial personality, are substantially related to earnings and employment status (and mortality) and have a relatively early age of onset. This pattern of early onset of symptoms and strong association with education, marital status, employment status, and earnings suggests

Table 7.7 **Hospitalization for Physical and Psychiatric Illnesses by Psychiatric Diagnosis**

Psychiatric Diagnosis	Total Number of Medical Hospital Admissions			Total Years of Medical Hospitalization			Total Number of Mental Hospital Admissions			Total Years of Mental Hospitalization		
	Mean	SD	N[a]	Mean	SD	N[a]	Mean	SD	N[a]	Mean	SD	N[a]
Entire sample	2.47	2.60	346	0.14	0.30	315	0.43	1.57	418	0.49	2.80	434
Well	1.97	2.37	109	0.08	0.24	108	0.01	0.10	109	0.00	0.01	110
Psychosis	2.39	2.27	36	0.21	0.31	29	2.62	3.33	42	3.63	7.16	42
Sociopathy	2.88	2.57	64	0.27	0.48	58	0.54	1.52	80	0.66	3.15	82
Alcoholism	2.36	1.82	25	0.07	0.10	22	0.73	2.13	30	0.07	0.29	31
Neurosis	2.57	2.39	46	0.12	0.25	45	0.02	0.15	46	0.04	0.24	46
No diagnosis, but sick	3.20	3.55	56	0.11	0.19	45	0.04	0.26	74	0.01	0.08	74
No estimate	1.50	1.79	10	0.06	0.08	8	0.00	0.00	37	0.00	0.00	49
Severe psychiatric disease, ever	2.82	2.51	130	0.20	0.38	115	1.00	2.20	146	1.34	4.62	148

[a]Number of nonmissing observations for this category.

Table 7.8 **Earnings, Education, and Hospitalization Levels for Subsamples of the Study Population**

Subsample (N)	Weekly Earnings, in Dollars[a]			Years of Schooling			Total Number of Medical Hospital Admissions		
	Mean	SD	N[b]	Mean	SD	N[b]	Mean	SD	N[b]
Alive and employed full time with known education and marital status (235)	122.19	56.78	235	10.29	3.22	235	2.48	2.54	231
Alive with known employment status, education, and marital status (314)	117.79	56.08	264	9.93	3.20	314	2.50	2.61	308
Dead (45)	94.58	57.56	12	9.37	2.76	39	2.15	2.46	33
Missing (not located for follow-up) (70)	108.33	75.62	6	6.60	1.08	5	2.50	3.70	4

[a]For persons with known positive earnings.

[b]Number of nonmissing observations for this category.

that mental disorders may provide more than a small clue to understanding and predicting who will be very poor.[14] It is also likely that familial patterns of mental disorders will show up as a significant factor in explaining familial patterns of earnings. Research in this area is likely to be of value in increasing the precision of forecasts about market participation and earnings of individuals.

Notes

1. Bartel and Taubman (1979) have examined the relationship between mental disorders and earnings and labor market participation. In that study, all mental disorders are combined into one category. The aggregate impact of mental disorders has been examined by Cooper and Rice (1976), and the economic cost of alcoholism has been studied by Berry and Boland (1977). For several decades psychiatric epidemiologists and sociologists have explored the relationship between socioeconomic status and mental disorders and have found that most psychiatric disorders are disproportionately concentrated among lower socioeconomic groups. There is a continuing exchange over the direction of causality. For an early example of research in this area see Faris and Dunham (1939). For a list of recent references to this literature, see Wheaton (1978).

2. Only 20% of all cases seen by the clinic over this period fulfilled all these criteria. The major loss was due to the IQ restriction: 55 to 65% of all referrals had IQ's below 80.

3. For a description of the original interview used by the St. Louis Municipal Psychiatric Clinic and the follow-up interview, see Appendices B and C in Robins (1966).

4. "Historically, once etiology is known, a disease stops being 'psychiatric.' Vitamins were discovered, whereupon vitamin-deficiency psychiatric disorders no longer were

Total Years of Medical Hospitalization			Total Number of Mental Hospital Admissions			Total Years of Mental Hospitalization		
Mean	SD	N[b]	Mean	SD	N[b]	Mean	SD	N[b]
0.12	0.26	217	0.20	1.01	233	0.04	0.29	235
0.14	0.31	286	0.42	1.68	31	0.37	2.05	314
0.11	0.17	26	0.36	0.87	44	0.83	4.12	45
0.48	0.68	2	0.50	1.43	58	0.82	4.37	70

treated by psychiatrists. The spirochete was found, then penicillin, and neurosyphilis, once a major psychiatric disorder, became one more infection treated by non-psychiatrists" (Woodruff, Goodwin, and Guze 1974, p. xi).

5. A substantial amount of recent research in psychiatry has been directed toward developing better predictors of the onset of mental disorders and more complete knowledge of their natural histories. A major effort is ongoing at Washington University to refine instruments for psychiatric diagnosis. The Diagnostic Interview Schedule, based on the format of the Renard Diagnostic Interview (Department of Psychiatry, Washington University) is currently in use in studies sponsored by the Division of Biometry and Epidemiology of the National Institute of Mental Health to assess the prevalence and incidence rates of specific psychiatric disorders in the general population. This instrument can be administered by individuals not specifically trained in clinical psychiatry and is computer scorable.

The techniques used in the Robins study were earlier versions of the current set of criteria and techniques, but Robins has indicated in private conversation that there is no reason to believe a significant shift in diagnostic classification of individuals would take place if the more recent criteria were applied.

6. See especially Wheeler et al. (1950).

7. Where estimates are available, the prevalence rates for the general population are subject to wide confidence intervals, and many can be considered only rough approximations. But even conservative estimates indicate that many individuals are affected. Prevalence rates are from Woodruff, Goodwin, and Guze (1974).

8. See Woodruff, Goodwin, and Guze (1974) for discussion and references concerning the familial patterns of each of these diseases.

9. "Marital status is the single most powerful predictor of labor force participation for prime age males" (Bowen and Finegan 1969, p. 40).

10. Economists are generally reluctant to examine variables such as marital status seriously even when they have a quantitatively important relationship with the behavior being examined, if a satisfactory theoretical explanation does not exist a priori. Whatever the merits of this methodology, it has at least one unintended benefit. The quantitative

estimates associated with these "uninteresting" variables are much less likely to be subject to investigator bias than those coefficients of theoretical interest.

11. Only individuals who died after age 25 were included in the sample of 434. The death rate before the age of 25 was approximately 4% for clinic patients and 1% for controls (Robins 1966, p. 32).

12. Alcoholics had low average utilization, but recall that in this study alcoholism as a diagnosis was possible only for individuals who were not diagnosed as sociopathic or psychotic.

13. Most of the time period examined here (between the 1920s and 1960) predated the development of the drugs which have dramatically shortened the length of stay in mental hospitals for many patients.

14. As noted earlier, a substantial literature outside economics exists on the relationship between mental disorders and socioeconomic status.

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