RESEARCH TRIANGLE INSTITUTE

(DRAFT)

FINAL REPORT

The Relationship of Mental Disorder to Violent Behavior

James J. Collins
Susan L. Bailey
Charles D. Phillips
Amy Craddock

Research Triangle Institute
Center for Social Research and Policy Analysis
P.O. Box 12194
Research Triangle Park, NC 27709

October 1988

Research for this report was made possible through the National Institute of Justice (Grant 86-15-CX-0034). Points of view are those of the authors and do not necessarily represent the official policies or positions of the U.S. Department of Justice. Some of the data used here were collected under NIMH grant No. R01-MH34895. The authors appreciate the comments of Drs. William E. Schlenger, John A. Fairbank, B. Kathleen Jordan, and the editorial assistance of Elizabeth Cavanaugh.

FINAL REPORT

The Relationship of Mental Disorder to Violent Behavior

James J. Collins
Susan L. Bailey
Charles D. Phillips
Amy Craddock

Research Triangle Institute
Center for Social Research and Policy Analysis
P.O. Box 12194
Research Triangle Park, NC 27709

October 1988

Research for this report was made possible through the National Institute of Justice (Grant 86-15-CX-0034). Points of view are those of the authors and do not necessarily represent the official policies or positions of the U.S. Department of Justice. Some of the data used here were collected under NIMH grant No. RO1-MH34895. The authors appreciate the comments of Drs. William E. Schlenger, John A. Fairbank, B. Kathleen Jordan, and the editorial assistance of Elizabeth Cavanaugh.

TABLE OF CONTENTS

Table of Contents (Continued)

LIST OF TABLES AND FIGURE

List of Tables and Figure (Continued)

FIGURE

PREFACE

Chapters 5, 6, 7, and 8 of this report can be read independently of the full report. The chapters deal with the relationships of mood disorders, traumatic stress disorder, and problem drinking to violent behavior, and the relationship between inmate's mental health status and involvement in institutional infractions. The chapters were written as professional journal manuscripts and include specifically relevant literature reviews and methodology sections. Each of these chapters is currently under peer review from various journals.

1. INTRODUCTION

The relationship of mental disorder to criminal behavior has been the focus of research, debate, and speculation for as long as the two concepts have existed. The case of Daniel M'Naghten, who was judged insane after his attempted murder of the British Prime Minister in 1853, is usually considered the first formal legal recognition that a "disease of the mind" may cause individuals to engage in criminal behavior. Behavioral scientists have attempted to understand whether or under what circumstances a disordered mental state might explain involvement in crime, but neither psychiatry nor criminology has provided definitive answers. Very complex and fundamental behavioral, social and scientific as well as political issues are involved.

In the popular imagination, a relationship between mental disorder and criminal behavior, especially violence, seems evident. In the scientific literature, matters are much less clear. A number of researchers have concluded that mental disorder is directly related to involvement in crime (Bland and Orn, 1986; Giovannoni and Gorel, 1967; Mulvey, Blumstein and Cohen, 1986; Rabkin, 1979; Rappaport and Lassen, 1965; Sosowsky, 1978; Steadman and Felson, 1981; Tardiff, 1985; Taylor, 1986). Others argue there is no direct relationship (Cohen, 1980; Cocozza, Melick and Steadman, 1978 and 1983; Hafner and Boker, 1973; Howells, 1982; Kozol, Boucher and Garofalo, 1972; Lurigio and Lewis, 1987; Melick, Steadman and Cocozza, 1979; Monahan and Steadman, 1983; Teplin, 1985; Valdiserri, Carrol and Hartl, 1986). Some of those arguing there is no effect contend that the frequently observed empirical association of mental disorder and crime is explained by other factors such as age, race, socioeconomic status, and previous criminal history. Research has shown, for example, that the proportion of males with police records admitted to psychiatric hospitals in recent history has increased, and that this tendency to offend, not the mental disorder, accounts for higher arrest rates among former mental patients (Melick, Steadman and Cocozza, 1979).

The following observations summarize the literature of the evidence on the relationship of mental disorder to violent behavior.

- the weight of recent evidence indicates higher arrest rates among those identified as mentally disordered;

- identified offenders display rates of mental disorder higher than the general population, especially for the substance abuse and antisocial personality disorders;

- it appears some mental disorder or symptom types are associated with violence while others are not;

- while it is accurate to say that control for demographic, criminal history, and other factors reduces the magnitude of the mental disorder-violence relationship, the relationship remains important for some disorder/symptom types when these factors are controlled.

The current study was intended to assess further these conclusions and to deal more effectively with some of the methodological problems of past work.

The uncertainty about the relationship of mental disorder to violence can be attributable to two major factors: (a) methodological shortcomings of past research, and (b) the complexity of the relationship. A fundamental problem has been the failure to define precisely the major concepts--mental disorder and violence. Mental disorders are often undifferentiated in research and discussion. Schizophrenia, depression, and alcohol abuse/dependence, for example, are often subsumed into a single category of "mental illness." Violence is likewise often not carefully defined. Aggression, threatening behavior, and actual violence are sometimes used interchangeably. Types of violent crime, such as homicide and robbery are often lumped together into a single category. Given these conceptual problems, the current state of knowledge on the relationship of mental disorder to violent behavior is understandably rudimentary.

The generalizability of findings from past studies is problematic. Study samples are often not representative of general population segments. Samples of current or former mental patients and criminal justice subjects such as prison inmates are commonly used for research purposes.

Analysis of data often has not controlled for multiple sources of variation. For example, known correlates of violence such as age and gender are often not controlled when the mental disorder/violence relationship is examined.

Most past research, in addition, has not dealt with temporal aspects of the mental disorder/violence relationship. The timing of disorder symptoms or states and violent acts relative to each other is only rarely examined, often because collecting the relevant data is difficult. This is a serious defect if mental states are considered as etiologically relevant to the occurrence of violence. The study reported here has only a limited capacity to examine the temporal order of the relationship.

In short, very little past work has been methodologically equal to the task of drawing firm inferences about the mental disorder/violence relationship.

Added to the methodological problems of past research are two additional complexities:

- the mental disorder/violence relationship, while sometimes found to be significant in a statistical sense, is not by itself a powerful explanatory factor;

- mental disorder and violent behavior are social constructs and are thus problematic from a positivist scientific perspective.

The limited explanatory capacity of disorder to account for violence (the first point above) is illustrated by two examples. Phillips, Wolf and Coons (1988) linked police, court and clinical records in a study of schizophrenia and violence in an Alaskan community. They found that schizophrenic individuals accounted for only 1.1 to 2.3 percent of arrests for violent crimes. Steadman (1987), a prominent skeptic about the mental disorder/violence relationship, acknowledges there is such a relationship in individual cases. He points to the "unusually high incidence of diagnosable mental illness" in studies of Presidential assassins. In the larger scheme of things, however, Steadman argues there is no good evidence that disorder itself accounts for a substantial proportion of the violence that occurs in U.S. society.

The second point above is illustrated by historical and social analyses that have dealt with the social reality of "madness" (Foucault, 1965; Menzies and Webster, forthcoming; Szasz, 1970). These analyses make clear that mental disorder is a difficult concept to deal with in scientific paradigms because of its roots in cultural and moral realities that resist the positivist approach to understanding. Moreover, the legal status of disorder, illustrated by the legal concepts of "not guilty by reason of insanity" or "guilty but insane," bring moral weight to bear against the scientific tradition. In a sense, the law ascribes a disorder/violence relationship, and scientists are not immune to this influence of the law. Historical and social forces introduce bias toward finding a direct disorder/violence relationship.

This report attempts to clarify the mental disorder/violence relationship by using a multivariate methodology to test the relationships of specific disorder types to violence. Separate chapters deal with schizophrenia and violence, affective disorders and violence, post-traumatic stress disorder and violence, problem drinking and violence, and mental disorder and inmate behavior.[1] These chapters can be read independently of the full report. Each has specifically relevant literature reviews and each includes a methodology section. A separate chapter deals with the widely quoted conclusions of Monahan and Steadman (1983) that there is no mental disorder/crime relationship when other factors are controlled. The conclusion of the current analysis is that their position is generally inaccurate and counterproductive from a public policy perspective.

1/ A brief review of the drug abuse/dependence relationship is included in Appendix A.

The current analysis is not without limitations--the major ones being that our data permit only partial analysis of the temporal nature of the disorder/violence relationship and that the study population consists of males incarcerated for serious offenses in a single state prison system. The sample is not representative of an identifiable segment of the general population. The sample is demographically similar to male state prison populations, however, and provides a unique opportunity to study the disorder/violence relationship. Few other data are available that include disorder-specific measures and multiple indicators of violence in sufficient numbers to support detailed examination of the mental disorder and violence relationship. Both phenomena are relatively rare in the general population.

Readers who intend to read each of the disorder/violence chapters and are not interested in basic disorder prevalences may wish to skip the next chapter on methodology. As indicated above, the individual chapters include methodology sections.

2. METHODOLOGY AND MENTAL DISORDER PREVALENCES

In the spring of 1983, 1,149 convicted male felons who were consecutive new admissions to North Carolina prisons from the community were interviewed at the five reception centers that process all male felons who enter the North Carolina prison system.[2] Interviews were conducted during the first days of the individual's incarceration by 14 professional survey research interviewers not affiliated with the Department of Correction. Interviewers had been trained in the use of the interview instruments during a 5-day classroom training session, with additional training at the data collection sites. Interviews were conducted in private or near-private circumstances and averaged approximately 1.5 hours.

Version III of the NIMH Diagnostic Interview Schedule (DIS) was used (Robins, Helzer, Croughan, and Ratcliff, 1981). Additional questions covered demographics, criminal history, and drug and alcohol use at the time of the offense that resulted in incarceration. The interview instruments also included a brief version of the General Health Questionnaire (GHQ) (Goldberg, 1978). Psychiatric diagnoses were made using responses to DIS questions and computer software developed specifically for this purpose. These diagnoses are referred to as DIS/DSM-III diagnoses.

Psychiatric diagnoses were made by considering the type, severity, recency, and age of onset of psychiatric symptoms. Although there were variations depending on disorder types, individuals were usually asked whether they had experienced a particular symptom in their lifetimes. (The DIS questions begin on page 8 of the questionnaire in Appendix B.) If an individual responded affirmatively to a symptom question, the interviewer then asked a series of probe questions (see probe chart in Appendix B) to establish whether a symptom was due to a psychiatric problem. A symptom caused by an illness, injury, medication, drugs, or alcohol was not classified as a psychiatric symptom. If the symptom was not the result of any of these and met severity criteria, it was classified as a psychiatric symptom. For most disorders, multiple symptoms were required before a definite diagnosis was made. Lifetime and current diagnoses were made. A "lifetime" diagnosis meant that criteria were satisfied at some time in the individual's life. "Current" diagnoses were made for the last two weeks, last month, last 6 months, and last year.

2/ The original study was funded by the National Institute of Mental Health under Grant No. 1-R01-MH34855-01A1.

The 1,149 interviews represent an 86.6 percent completion rate. Among 1,327 eligible inmates, 10.2 percent refused to participate, 2.6 percent were transferred to other institutions before the interview could be completed, and 0.6 percent were not interviewed for other reasons such as physical or mental incapacitation or a language barrier. Those not interviewed tended to be older and to have more serious criminal histories than those who were interviewed. Table 1 shows the respondents' demographic characteristics. Three-quarters of the respondents were age 30 or younger. More than half of the respondents were black, and 74 percent had less than a high school education. More than two-thirds lived in urban areas. Sentences were longer than 3 years for a majority of respondents.

PREVALENCE OF PSYCHIATRIC DISORDER AMONG THE INMATES

Some research has dealt specifically with mental disorder among inmates in correctional institutions. Much past work has dealt with jail inmates (e.g., Gibbs, 1978, 1982; Lamb and Grant, 1983; Schuckit, Herrman, and Schuckit, 1977; Swank and Winer, 1976; Teplin, 1987) or did not use an epidemiological approach or standard diagnostic categories to estimate the prevalence of disorder. Past work usually focused on inmates who had histories of mental disorder and who had been referred for mental health treatment. Diagnostic instruments such as the Minnesota Multiphasic Personality Inventory (MMPI) or the Symptom Check List (SCL) are also often used, though these instruments do not produce standard psychiatric diagnoses.

Three studies used an epidemiological methodology and standard psychiatric diagnosis to estimate the prevalence of types of mental disorders in prison populations. Other work examined psychiatric disorder among criminals (e.g., Guze, 1976), but only two standard epidemiological studies used prison inmates.

James, Gregory and Jones (1980) reported results from interviews with a stratified random sample of 174 Oklahoma prison inmates. Seven clinical psychologists and seven psychiatrists conducted diagnostic interviews and classified 35 percent as having a personality disorder, 25 percent as having a primary diagnosis of substance abuse, and 5 percent as schizophrenic.

Hare (1983) used semi-structured interviews, medical files, case histories, and a 22-item psychopathy checklist to diagnose antisocial personality (ASP) disorder among a representative sample of 246 Canadian federal and provincial prisoners. Two clinicians made independent diagnoses of these prisoners. Thirty-nine percent were diagnosed as having antisocial personality by both judges; 50 percent were diagnosed by at least one judge. Inter-judge diagnostic reliability was high, ranging between .75 and .79, depending on sample subcategory. Eighty-five percent of the antisocial diagnoses were primary diagnoses. Antisocial personality diagnoses were invariably accompanied by additional diagnoses, usually including a substance abuse disorder. Forty-nine percent of the sample received a substance abuse diagnosis.

Table 1. Characteristics of Inmate Respondents

AGE	
18-20	20.8%
21-24	27.3
25-30	26.7
31-40	16.7
41 or older	8.4
RACE	
White	44.7%
Black	51.3
Other	2.8
Unknown	1.2
EDUCATION	
Less than high school	74.2%
High school or more	25.7
Unknown	0.1
RESIDENCE	
Urban	68.0%
Rural	31.9
Unknown	0.1
SENTENCE LENGTH	
3 years or less	47.1%
Over 3 years	52.9

Note. Percents may not add to 100 due to rounding.

Neighbors et al. (1987) interviewed 1,070 residents of Michigan's Department of Correction's facilities using the Diagnostic Interview Schedule (DIS)--the same instrument used in the current study. They found lifetime prevalences of 2.8 percent of schizophrenia, 0.5 to 6.4 percent for the various mood disorders, 1.6 percent for panic disorder, 22 percent for generalized anxiety disorder, 5.9 percent for obsessive compulsive, and 6.0 percent for traumatic stress disorders. Half of the Michigan prisoners were diagnosed as having antisocial personality, and 46.5 percent satisfied the criteria for a lifetime diagnosis of alcohol abuse/dependence. About one in five of the prison population were judged clinically to be severely impaired.

Table 2 provides lifetime prevalence estimates for 18 major categories of DSM-III psychiatric disorder in the inmate sample studied here. Individuals are classified as having a disorder if they have met DSM-III diagnostic criteria to a stipulated severity at some time in their lives. For example, the antisocial personality disorder diagnosis is assigned if an individual reports three or more conduct disorder types beginning before age 15, and four or more conduct disorder types beginning after age 18.

Twenty-nine percent of the new admissions met the lifetime diagnostic criteria for antisocial personality disorder (Table 2). This is somewhat lower than the 35 percent found in the Oklahoma study (James et al., 1980), the 39 and 50 percent found by Hare (1983), and the 50 percent found by Neighbors et al. (1987). Diagnoses in the Oklahoma study were made according to the DSM-II rules which were somewhat different from those in DSM-III. Additionally, if the antisocial personality criteria were loosened from three to two pre-age 15 conduct disorder types and from four to three post-age 18 conduct disorder types, 51 percent of the North Carolina inmate sample would be diagnosed as antisocial personality. Thus, the disparity between earlier findings and those presented here is likely to be explained partially by differences in the diagnostic procedures.

However, this does not account for the difference between the findings reported here and those of the Michigan sample reported in Neighbors et al. (50 percent). The latter study used the same diagnostic instrument as the current one. One difference between the current and Neighbors et al. study is the sample. The sample for the present study was drawn from prison admissions. The Michigan sample was drawn from the current prison population. The current population sample probably overrepresents more seriously deviant individuals, and this may account, in part, for the difference between the two ASP prevalence estimates.

Half of the inmates in the sample are diagnosed as being or having been alcohol abusers or alcohol dependent at some time in their lives. Nineteen percent are classified as abusing or having abused or been dependent upon one or more drugs; this rate is less than the rates found by James et al. (1980) and Hare (1983). Abuse of marijuana and opioids are the most common forms of substance use disorder.

Table 2. Lifetime Prevalence Rates for DSM-III Psychiatric Disorders: North Carolina Male Felon Prison Inmates (n=1140)

Type of Disorder	Prevalence
	%
Alcohol abuse/dependence	49.5
Antisocial personality	28.9
Sexual dysfunction	21.0
Substance abuse/dependence (any)	18.8
(opioids)	(9.4)
(cocaine)	(2.5)
(barbiturates)	(6.0)
(amphetamines)	(6.7)
(hallucinogens)	(1.4)
(marijuana)	(17.8)
Simple phobia	11.2
Major depressive episode	5.3
Agoraphobia	5.0
Obsessive compulsive	4.1
Dysthymia	3.5
Post traumatic stress	2.3
Social phobia	2.1
Pathological gambling	1.9
Manic episode	1.1
Schizophrenia	1.4
Bipolar	0.8
Cognitive deficit (severe)	0.4
Schizophreniform	0.0
Anorexia nervosa	0.0
Panic	0.0
Any disorder	77.5

Note. Prevalence for the 1,140 inmates is more than 100 percent because an individual could have more than one diagnosis. Specific drug disorder prevalences exceed the overall 18.8 percent rate for substance abuse dependence due to multiple diagnoses.

Fully 21 percent of the inmates were diagnosed as having a sexual dysfunction. This diagnosis is based on such criteria as persistent lack of interest in sex, persistent problems with pain during intercourse, rare or absent orgasm, and lack of pleasure in sex. Neighbors et al. (1987) found a similar prevalence.

With the exception of simple phobias (11 percent), most other disorder types are fairly uncommon and a few were found to be completely absent in our sample of prison inmates.

DEMOGRAPHIC VARIATION IN PSYCHIATRIC DISORDER

Table 3 shows variation in psychiatric disorders by race, age and education. Whites are more likely than blacks to receive antisocial personality and substance abuse diagnoses. Most other racial comparisons do not indicate marked differences. Younger inmates and those with less than a high school education are more likely than their counterparts to receive an ASP diagnosis. Most other differences for age and education are not substantial.

CRIMINAL HISTORY AND PSYCHIATRIC DISORDER

Prison inmates were asked to report the number of times they had been arrested before the arrest that resulted in their current incarceration. Table 4 shows psychiatric disorder prevalences by number of self-reported prior arrests. The data in the first three rows of the table provide strong evidence for a relationship between antisocial personality, alcohol abuse/dependence, substance abuse/dependence, and seriousness of criminal career as measured by number of prior arrests. The antisocial personality/substance abuse disorder relationships were examined in detail in Collins, Schlenger, and Jordan, 1988. The existence of substance abuse with ASP was associated with higher ASP symptom frequency.

As the number of prior arrests increases, the percentage of inmates who are diagnosed as having one of these three disorders also increases. The prevalences for antisocial personality, alcohol abuse/dependence, and substance abuse/dependence for those with five or more arrests are 5.2, 13.4 and 5.8 times higher, respectively, than for individuals who report no arrests before the one that resulted in their incarceration. There is little or no apparent relationship between other diagnoses and criminal history. The direct relationship between any diagnosis and criminal history is primarily a function of the strong direct relationships for the antisocial, alcohol, and substance abuse disorders.

The observed relationships between antisocial personality, alcohol abuse/dependence, and substance abuse/dependence disorders and criminal history are consistent with prior evidence. Most prior work, however, has not examined the relationship of these disorders to seriousness of criminal career. In the North Carolina prison inmate study and other studies, the disorders have been found disproportionately in samples of individuals officially labeled as offenders. The North Carolina data show for the

Table 3. Lifetime Prevalences of DIS/DSM-III Diagnoses by Race, Age, and Education: N.C. Prison Inmates

	Race			Age			Education	
	White (513)	Black (592)	Other (32)	18-24 (553)	25-44 (535)	45-64 (58)	Less Than High School (852)	High School or More (294)
Antisocial personality	34.4	23.8	33.3	31.8	27.9	14.3	32.0	20.2
Alcohol abuse/dependence	65.8	35.1	50.0	47.5	51.6	50.9	48.7	51.1
Substance abuse/dependence	26.6	12.5	6.9	18.8	20.1	7.1	18.2	20.8
Simple phobia	8.8	13.0	15.6	11.2	11.0	15.5	11.9	9.5
Cognitive deficit	0.2	0.5	0.0	0.2	0.6	0.0	0.4	0.3
Major depressive episode	6.2	4.4	6.7	4.5	6.6	1.8	4.2	8.5
Agoraphobia	5.9	3.1	15.6	4.7	5.1	6.9	5.3	4.1
Obsessive compulsive	4.3	3.9	6.7	4.4	4.2	1.8	3.7	5.5
Dysthymia	2.3	1.9	0.0	0.9	3.2	1.8	2.0	2.1
Manic episode	1.2	2.4	0.0	0.7	1.7	0.0	0.7	2.4
Schizophrenia	1.0	1.0	0.0	0.4	1.7	0.0	1.0	1.0
Schizophreniform	0.0	0.3	0.0	0.2	0.2	0.0	0.1	0.3
Any Disorder	78.8	62.7	71.9	68.5	72.0	65.5		

Note. Prevalences of diagnoses total more than 100 percent because an individual could have more than one diagnosis.

Table 4. Lifetime Prevalences of DSM-III Diagnoses by Number of Previous Arrests: N.C. Prison Inmates

Diagnosis	Number of Previous Arrests					
	0 (216)	1 (198)	2 (178)	3 (133)	4 (107)	5 or More (279)
Antisocial personality	9.3	20.3	21.9	26.3	40.2	48.8
Alcohol abuse/dependence	5.1	12.7	17.5	53.0	48.6	67.0
Substance abuse/dependence	5.1	12.7	17.5	22.1	22.4	29.8
Simple phobia	12.0	13.1	10.1	11.4	4.7	11.9
Cognitive deficit	0.0	0.5	0.6	0.0	0.9	0.4
Major depressive episode	5.1	5.1	4.5	3.8	5.6	6.5
Agoraphobia	3.7	4.6	5.6	6.8	2.8	5.0
Obsessive compulsive	1.9	3.5	6.7	3.8	3.7	5.0
Dysthymia	1.4	2.5	1.7	2.3	0.0	2.9
Manic episode	1.4	1.5	0.6	0.8	0.0	1.8
Schizophrenia	0.5	0.0	1.7	0.8	0.0	1.4
Schizophreniform	0.0	1.0	0.0	0.0	0.0	0.0
Any Diagnosis	62.1	75.3	75.8	79.7	81.3	89.3

first time the escalating prevalence of the three disorder types as prior arrests increase (table 4).

Antisocial, alcohol, and substance abuse disorders, on the one hand, and arrests, on the other hand, shared definitional elements. Some of the behavioral criteria for antisocial personality disorder, truancy and fighting, for example, can result in arrest, and arrest is itself a diagnostic criterion for ASP. Arrests will not by themselves result in a diagnosis for ASP, but they do raise the likelihood of such a diagnosis.[3] It is also true that heavy drinking (public drunkenness is a criminal offense in many places) and substance use (heroin, cocaine, and marijuana use is almost always illegal) increase the likelihood that individuals will be arrested. On the other hand, there is independence. Later analyses will attempt to control for the effects of the variation shared by the variables in question.

3/ One of the basic assumptions about psychiatric disorders as operationalized in DSM-III is that disorders represent clinically significant behavioral or psychological syndromes that are associated with painful symptoms (e.g., distress) or impaired functioning. It is further assumed that the syndrome results from a behavioral, psychological, or biological dysfunction, and is not solely the result of conflict between an individual and society. DSM-III goes on to state that "When the disturbance is limited to a conflict between an individual and society, this may represent social deviance, which may or may not be commendable, but is not by itself a mental disorder" (APA, 1980, p.6, emphasis in original).

3. CURRENT EVIDENCE ON THE MENTAL DISORDER/VIOLENCE RELATIONSHIP

In a 1983 review chapter, Monahan and Steadman concluded that there is no relationship between mental disorder and crime when other factors are controlled. This global conclusion has been widely discussed but, to our knowledge, it has not been examined critically in the published literature. The alternative assessment of the relationship between mental disorder and violence in this chapter concludes that (1) the Monahan-Steadman review had methodological and logical flaws, and its findings were not justified and (2) there is clear evidence of a relationship between some forms or symptoms of mental disorder and violence. The empirical evidence does not generally show that mental disorder is, by itself, a powerful predictor of violence, but there is sound evidence that it is often a significant correlate of violence when other factors are controlled.

In defense of the Monahan-Steadman position, there are good reasons to be cautious about pointing to a direct relationship between mental disorder and violence.

- the psychological and medical sciences have been only partially successful in specifying objective criteria that define various mental disorder types;
- much past research on the issue has been flawed methodologically, and inferences made about the existence or absence of a relationship have sometimes not been justified;
- mental disorder is in part a social construct and, thus, incorporates cultural and moral judgments; the popular assumption that the mentally ill are dangerous suggests caution in ascribing blame for violent behavior to mental disorder;
- most attempts to predict violence using individual characteristics, including indicators of mental disorder, have been unsuccessful or statistically weak;
- mental disorder may account for only a small proportion of violent behavior and thus may be an inappropriate focus for public policy attempting to reduce levels of violence in society;

- offenders who are labeled as mentally disordered may receive legal sanctions that are disproportionate to the severity of their illegal behavior.

Monahan and Steadman's review has received widespread attention although it obfuscates the goal of understanding the mental disorder/violence relationship as fully as current scientific methods and evidence permit. A June 1988 search of the Social Science Citation Index revealed 19 citations to their 1983 article. Moreover, a summary of the article findings (Monahan and Steadman, 1984) has been widely circulated. As of September, 1988, the National Criminal Justice Reference Service had sent a summary of the article's conclusions to approximately 15,000 academics, researchers, policymakers and others.

It should be noted that both Monahan and Steadman appear to have moderated their conclusions since publication of their 1983 article. Steadman (1987) acknowledges that mental disorder may account for violence in some circumstances. Monahan (1984) seems optimistic that a new generation of theory may improve the ability to predict violence using clinical criteria.

The next section deals more specifically with the Monahan and Steadman analysis and conclusions.

THE MONAHAN-STEADMAN CONCLUSIONS

Monahan and Steadman (1983) used an epidemiological framework to examine the relationship between criminal behavior and mental disorder. The authors distinguish "true" and "treated" estimates of the two phenomena. True criminal behavior and mental disorder are behaviors or conditions that took place. An act of assault, for example, is "true" criminal behavior. The assault becomes "treated" when it is officially recognized by professionals or experts by arrest, conviction, or penalty. An individual who satisfies criteria for a diagnosis of schizophrenia has a true mental disorder. When the individual is formally identified, treated, or diagnosed by a mental health professional, he is considered treated in Monahan and Steadman's scheme.

The true/treated dichotomy for criminal behavior and mental disorder is shown in a two-by-two table.

Criminal Behavior	Mental Disorder: true	Mental Disorder: treated
true	a	b
treated	c	d

Monahan and Steadman reviewed previous research on the relationship between crime and mental disorder in the four categories created by the table: (a) true criminal behavior and true mental disorder, (b) true criminal behavior and treated mental disorder, (c) treated criminal behavior and true mental disorder, and (d) treated criminal behavior and treated criminal disorder. Their final conclusion after reviewing the epidemiological data is that

> ...when one makes the appropriate controls for demographic and anamnestic factors (e.g., prior patterns of institutionalization), rates of true and treated criminal behavior vary independently of rates of true and treated mental disorder. While the unadjusted crime rate of the mentally ill is indeed higher than that of the general population, and the unadjusted rate of mental disorder among criminals is indeed higher than among the general population, both relations tend to disappear when the appropriate statistical adjustments are made for age, social class, and prior exposure to the mental health and criminal justice systems.
>
> Monahan and Steadman, 1983:181.

This conclusion goes far beyond what is justified by the evidence.

CRITIQUE OF MONAHAN-STEADMAN

The first problem with the Monahan-Steadman conclusion comes from their imprecise definition of mental disorder. Because diagnostic reliability is lower for "less severe" mental disorders (substance abuse disorders, the personality disorders, and less severe anxiety disorders), their review focuses mainly on "major" or "serious" mental disorders (see p. 151). One might infer that these are the American Psychiatric Association (APA) DSM III Axis I disorders (excluding the substance abuse disorders) and are mainly those conditions with psychotic features. Monahan and Steadman's lack of definitional specificity typifies the problems found in the literature on mental disorder and violent behavior--namely, that major terms are often not carefully defined. Mental disorders are often undifferentiated in research discussion. Schizophrenia, depression, and alcohol abuse/dependence, for example, are often subsumed into a single category of "mental illness." Research subjects are often simply identified as patients with psychiatric symptom. Criminal behavior likewise includes a wide variety of activities: violent acts, acquisitive crimes, consensual offenses such as gambling and prostitution, and public order offenses such as drunkenness or disturbing the peace. Even violent criminal acts are heterogeneous, including homicide, forcible rape, and robbery. Thus, Monahan and Steadman drew conclusions from previous research findings that have fundamental flaws.

Monahan and Steadman's relegation of the substance abuse disorders to the "less severe" category is questionable. The pathology associated with these disorders is often quite severe. Moreover, many studies have shown

an association between alcohol use and violence (see Chapter 7 in this report). Similarly, antisocial personality disorder is a controversial disorder category, because it is highly correlated with criminal behavior. Admittedly, there is some circularity in considering their relationship because criminal behavior contributes to a diagnosis of antisocial personality disorder, but important other features of antisocial personality disorder are independent of involvement in crime.

Monahan and Steadman's conclusion that mental disorder and criminal behavior vary independently of one another when age, social class, and prior exposure to the mental health and criminal justice systems are controlled may be true, but it is irrelevant from an explanatory perspective. Mental disorder and criminal behavior may share common causal elements. More importantly, there is no logical reason to adjust statistically for prior exposure to the mental health and criminal justice systems when analyzing the mental disorder/violence relationship. If a direct relationship between them is observed, the mental health system exposure may be an etiological factor in violence. Mental health system exposure should not be used to "discount" a possible mental disorder/violence relationship. Similarly, there should be no "adjustment" for previous exposure to the criminal justice system in estimating the disorder/violence relationship. Presumably, Monahan and Steadman suggest this adjustment because a previous criminal history is associated with subsequent involvement in criminal behavior, but a simple adjustment for criminal history may very well mask a mental disorder/criminal history relationship. Criminal history variation should be controlled in the estimation of the disorder/violence relationship only if the independent effects of mental health status and criminal history factors can be isolated. In short, Monahan and Steadman's advice to adjust statistically for prior mental health and criminal justice variation has the effect of underestimating the disorder/violence relationship.

Finally, Monahan and Steadman may simply be wrong, even if the definition of disorder is narrowly construed. They acknowledge that the evidence of the independence of mental disorder and criminal behavior is somewhat inconsistent, and other researchers interpret the evidence differently.

This report also provides evidence of a disorder/violence relationship:

- for schizophrenia and some of its symptoms and expressive violence.
- between posttraumatic stress disorder and expressive violence, and
- between dysthymia (a mood disorder) and robbery,
- for selected problem drinking symptoms and expressive violence,

These findings result from multivariate modeling where variation accounted for by demographic and other factors is controlled. The analyses in this report have limitations, but they suggest clearly that some disorders and symptoms are associated with violence. The chapters that follow provide details.

In summary, the Monahan and Steadman conclusions are not justified by the evidence they reviewed, and appear to be inaccurate for selected mental disorder and violent behavior categories.

4. SCHIZOPHRENIA AND VIOLENCE

INTRODUCTION

This short chapter deals with the relationship of schizophrenia and its symptoms to violence. Because the number of schizophrenic subjects among the inmates is low, only basic multivariate analyses were possible, and findings must be interpreted cautiously.

Schizophrenia is thought to be the Axis I[4] psychiatric disorder most likely to be associated with violence (alcohol abuse/dependence excepted), although the evidence is not consistent. After reviewing the literature, Taylor (1982:272) concluded that "(W)ithin the mentally ill group schizophrenics are probably the most violence prone." It is also clear, however, that the relationship of schizophrenia to violence is not simple and straightforward. Some researchers find no relationship, and others find a relationship under some circumstances. Hafner and Boker (1973) suggest that violence is more likely to develop some time after schizophrenia develops. Other work finds that violence is related to only some schizophrenic subtypes. Planansky and Johnston (1977), for example, found that schizophrenics who displayed paranoid symptoms were more likely to be violent than schizophrenics without these symptoms. Giovannoni and Gurel (1967) examined "socially disruptive behavior rates" for 1,274 former (95 percent schizophrenic) inpatients in a Veterans Administration project. The patient rates exceeded those of the general population for homicide, aggravated assault, and robbery.

Krakowski, Jaeger, and Volavka (1988) found that 44 psychiatric admissions patients with a diagnosis of personality disorder or mental retardation were considerably more violent than patients with a diagnosis of schizophrenia. Klassen and O'Connor (1988) studied adult males who were inpatients at a community mental health center and who were considered potentially violent. Forty-five percent were diagnosed as schizophrenic. Of 252 subjects followed up in the community, 29 percent had violence histories. Results were inconsistent. Arrest for violence was positively associated with a non-schizophrenic diagnosis, but self-reported violence was positively associated with a schizophrenic diagnosis.

4/ DSM-III uses a "multiaxial" system of diagnosis. All psychiatric disorders except personality disorders and certain developmental disorders are considered Axis I disorders.

Finally, Phillips, Wolf, and Coons linked clinical data from psychiatric files and police and court records for Alaska for the 1977-1981 period. The authors found that each year 0.2 to 2.0 percent of all schizophrenic individuals in the community were arrested for violent crimes and that these people accounted for 1.1 to 2.3 percent of all arrests for violent crimes. They conclude that "...schizophrenic patients are not to any appreciable extent responsible for the high level of violence in our society" (Phillips, Wolf, and Coons, 1988:609).

Relationships in Inmate Sample

Only 16 subjects in the North Carolina prison inmate sample satisfied the necessary criteria for a diagnosis of schizophrenia--a number insufficient for detailed multivariate analysis of the schizophrenia/violence relationship. A number of logistic regression models were estimated to examine whether schizophrenia or its symptoms were associated with six different indicators of violence. The violence indicators were:

1. multiple incidents of fighting since age 18 (self-report): 41 percent of sample;

2. arrest for a violent offense in the year before incarceration (self-report): 29 percent of sample;

3. an arrest history for homicide, rape, or serious assault, i.e., for "expressive" violence (state police criminal histories): 31 percent of sample;

4. an arrest history for robbery, i.e., for "instrumental" violence, (state police criminal histories): 17 percent of sample;

5. currently incarcerated for homicide, rape, or serious assault, i.e., for "expressive violence" (Department of Correction records): 14 percent of sample;

6. currently incarcerated for robbery, i.e., for "instrumental" violence (Department of Correction records): 12 percent of sample.

Separate models were estimated for each violence indicator. Because age and race are known correlates of violence, they were included in models. Five "lifetime" schizophrenia indicators were developed. Individuals were classified according to whether they had satisfied the criteria for a diagnosis of schizophrenia at some time during their lives or had experienced various symptoms of schizophrenia at some time during their lives. The Diagnostic Interview Schedule (DIS), which was discussed in the last chapter, was used to make disorder and symptom diagnoses. The percentages meeting the various criteria are:

Schizophrenia Indicators	Prevalence (%)
fully satisfied disorder criteria	1.4
one or more disorder symptom(s)	14.7
one or more delusional symptom(s)	6.6
one or more paranoid delusional symptom(s)	5.1
one or more hallucination symptom(s)	4.9

Only one of these disorder or symptom indicators was tested per model. Thus, a total of 30 models were analyzed (six violence indicators x five disorder/symptom variables).

The findings of the modeling are:

1. There is limited evidence ($p<.10$) of a relationship between a schizophrenia diagnosis and current incarceration for expressive violence;

2. There is evidence ($p<.05$) of a relationship between hallucination symptoms and a history of fighting;

3. There is no evidence of a relationship between schizophrenia or its symptoms and arrest for violence;

4. In only two of the 30 models (points 1 and 2 above) was there evidence of a statistically significant schizophrenia disorder/symptom relationship to violence when age and race were controlled.

Because of the low prevalences of four of the five schizophrenia independent variables, these findings should be interpreted with caution. Moreover, because the data do not allow for more detailed analyses, such as examining the temporal ordering of schizophrenia symptoms and violence, further interpretation is not appropriate.

5. MOOD DISORDERS AND VIOLENCE

One general category of disorders demonstrating inconsistent relationships with violent behavior is affective or mood disorders. This chapter examines the relationship of mood disorders to a number of violence measures. Mood disorders include manic episodes, single and recurrent major depressive episodes, bipolar disorders, and cyclothymic and dysthymic disorders (American Psychiatric Association, 1980). It was possible to extend the analytic framework by focusing on numbers of symptoms characterizing recurrent depression and dysthymia and one additional mood disorder (manic episodes). The low prevalence of the other disorder types would not support analyses.

PAST RESEARCH

The results of the few studies that have examined the relationship of mood or affective disorder to violence are inconsistent. Anthony (1968) found that a conviction record for violence was positively associated with reactive depression in a sample of young offenders in England. Harrer and Kohler-Westergren (1986) similarly suggest that the neurotic and reactive depressed may be more prone to violence than are the endogenous depressed. Bauermeister (1980), on the other hand, found that boys with depression had lower fighting frequencies than nondepressed boys. Yesavage (1983) studied instances of verbal and physical assault and being placed in seclusion for violent rule infractions among 40 male inpatients diagnosed as having bipolar disorder. The subjects were separated according to whether they were currently experiencing a manic or depressive episode. The manic state was found to be associated with all three violent behaviors. Craig (1982) found no relationship between mania and assault among residents of a single catchment area admitted to a public mental health facility. Howells (1982), however, concluded from a review of relevant studies that the link between depression and serious violence, such as homicide, is the most widely accepted in clinical practice.

Using the Diagnostic Interview Schedule (DIS), the same mental disorder diagnostic instrument used in the current study, Bland and Orn (1986) reported finding relationships between alcohol disorder, antisocial personality disorder, and recurrent depression and involvement in family violence. This work showed an especially strong direct relationship to family violence among those who were diagnosed as having both an alcohol disorder and recurrent depression.

Using community level data, Lyons (1972) studied depressive illness and aggression in Belfast and County Down, Northern Ireland. He hypothesized an inverse relationship between depressive illness and the opportunity to express aggressive behavior; that is, the incidence of depressive illness and suicide would be lower in Belfast during the 1969-1970 period when rioting was severe. This hypothesis was supported. More specifically, the incidence of depressive illness was lower during the riot period, and the reduced incidence most pronounced in areas experiencing more serious rioting. Suicides were also lower during the riot period. Reductions were especially pronounced among males with endogenous depression. In County Down, a relatively peaceful area, there was a sharp increase in male depression. Homicides increased in Northern Ireland during the riot period.

The Anthony (1968) and Yesavage (1983) and Bland and Orn (1986) studies suggest a direct relationship between some aspects of mood disorder and violence among individuals, but the Bauermeister (1980) and Craig (1982) results do not support this inference. The Lyons (1972) study, using aggregate level data, suggests an inverse relationship between depressive illness and violence, but this finding can be interpreted only at the community, not at the individual, level. Inconsistencies of previous study results and the limited attention that has been paid to the issue suggest the mood disorder/violence relationship needs more attention. Previous findings also suggest that new work should examine the relationship in as much detail as possible because mood disorders include a variety of states and symptoms. Moreover, other factors that may account for violence should be controlled in the assessment of the impact of mood disorders and their symptoms on the occurrence of violence.

As the studies reviewed here demonstrate, an additional reason for the inconsistent results is the focus on several different types of violent behavior. These studies, for example, included convictions for unspecified types of violent offenses, frequencies of fighting, instances of verbal and physical assault, aggressive rioting, homicide, and suicide. The different types of mood disorders and symptoms must be compared to types of violent behavior to address this issue of inconsistent results and to understand more clearly the relationship between mood disorders and violent behavior.

This chapter addresses the question of a mood disorder/violence relationship among individuals by examining whether (a) various mood disorder diagnoses are associated with involvement in violence, and (b) different numbers and types of mood disorder symptoms are related to different types of involvement in violence. These questions are addressed using multivariate analyses that control for the effects of age, race, and education, which are known correlates of involvement in violence (Blumstein et al., 1986). Their inclusion in the analyses will allow a clearer assessment of the unique capacity of mood disorders to account for violence.

Alcohol disorder symptoms are also known to be related to violence (Collins, 1981, 1986; Chapter 7 this report) and often co-occur or interact with mood disorders. Mayfield and Allen (1967) found in an experiment with alcoholic patients, severely depressed patients, and a control group, for

example, that alcohol had a palliative effect on the affective state of the depressed patients but not on the alcoholic patients. The alcoholic patients showed a trend toward affective deterioration. Langevin et al. (1987) found that a group of violent offenders differed from a control group of property offenders in the likelihood of experiencing alcohol- or drug-related mood dysphoria. Finally, as noted above, Bland and Orn (1986) found a very strong relationship to family violence when both recurrent depression and an alcohol disorder were present. The inclusion of alcohol disorder symptoms in the models will further strengthen the capacity of analyses to estimate the unique effects of mood disorders.

Thus, the models to be analyzed later examine the relationship of demographic, alcohol disorder, and mood disorder variables to different types of violent behavior. The goal is to understand the unique capacity of mood disorders and their symptoms to account for variation in violent behavior; the inclusion of the demographic and alcohol disorder variables in multivariate models will control for the known relationships that these factors have to violence and, so, will provide a rigorous test of the relationship of mood disorders to violence.

APPROACH

Data

Using the DIS, data were gathered from 1,149 adult males recently admitted to North Carolina prisons after conviction for a felony (serious) offense in 1983. The DIS was developed for use by nonclinical interviewers and is based on DSM-III criteria for psychiatric disorders (Robins et al., 1981). Through a series of standardized questions, the DIS determines whether the DSM-III symptoms individuals have experienced are serious enough to be considered psychiatric symptoms and whether the symptoms may be attributable to other factors such as a physical disorder or drug or alcohol use. Psychiatric symptom counts (and other diagnostic criteria) are then used to make diagnoses for various disorders using specially developed computer software. Diagnoses are made for different time periods such as lifetime and the last 6 months.

Several studies have found the diagnostic validity of the DIS for mood disorders and symptoms to be high (Hendricks et al., 1983; Hesselbrock et al., 1982; Robins et al., 1982; Weller et al. 1985). There are, however, some problems with the DIS. Helzer et al. (1985), for example, found the DIS underdiagnosed major depression, and Anthony et al., (1985) found differences in diagnoses made by the DIS and psychiatrists. Given the generally high level of diagnostic validity, however, any analyses involving the disorder and symptom measures are worthwhile.

This paper uses the DIS diagnoses for major depression and dysthymia. They are referred to as DIS-DSM-III diagnoses. Lifetime disorder and symptom variables are used in the analyses. The reader will note later that the numbers of individuals in some mood disorder categories were not large enough to support analyses. This limitation is partially offset by using disorder symptom counts in place of diagnoses in the analysis.

Data for 1,149 subjects were available, but nine cases were dropped due to erroneous interviews or inconsistent data. Among the 1,327 eligible inmates, 10.2 percent refused to participate, 2.6 percent were transferred to other institutions before the interview could be completed, and 0.6 percent were not interviewed for other reasons such as physical or mental incapacitation or a language barrier. Those not interviewed tended to be older, to be nonwhite, and to have more serious criminal histories than those interviewed. Of those interviewed, 52.1 percent were age 25 or older, 45.1 percent were white, and 25.8 percent had at least a high school education.

Dependent Variables

Six indicators of violence were used in the analyses. Incidents of fighting in adulthood and recent arrests for violent offenses were based on self-reports in the interview. For the adulthood fighting measure, 41.2 percent of subjects reported having been in more than one fight since age 18 that came to swapping blows with someone other than a wife/partner. Nearly 29 percent of subjects reported one or more arrests in the year before the interview for a violent offense such as homicide, rape, assault, or robbery.

Four other violent behavior measures were based on data from official records. Current incarceration for expressive and for instrumental violent offenses were created from Department of Correction's court commitment papers. Subjects incarcerated during the interview period for murder, manslaughter, forcible rape, or serious assault were included in the expressive violence measure; those incarcerated for robbery were included in the instrumental violence measure. Almost 14 percent of subjects were incarcerated during the interview period for acts of expressive violence and 12 percent for acts of instrumental violence or robbery.

Measures of lifetime arrests for expressive and instrumental violent offenses were created from the State Bureau of Investigation arrest histories. Expressive and instrumental violence arrests were grouped in the same manner as the current incarceration measures. Thirty-one percent of the sample had at least one lifetime arrest for an expressive violent offense, and 16.8 percent had at least one arrest for instrumental violence.

These six violent behavior measures represent differences in types of violence (expressive, instrumental, or undifferentiated), differences in the seriousness and official reaction to the violence (unpunished fighting, arrests, incarcerations), differences in the source of information (self-reports or official records), and differences in the periods in the subjects' lifetimes (arrests only in the last year, lifetime arrests, fighting only in the adulthood years).

The frequency distributions of these violent behavior measures were positively skewed with the greatest proportion of cases having the value of zero. Consequently, the measures were dichotomized with the categories of no arrests, incarcerations, or incidences of fighting receiving a value of zero, and one or more arrests, incarcerations, or incidences receiving a

value of one (1). With dichotomized categorical dependent variables, the statistical procedure appropriate for multivariate model testing is logistic regression.

Methods and Models

Logistic regression uses maximum likelihood to estimate logged regression coefficients for the effects of the independent measures on the dependent measures. Each variable in the model is dummy coded where one category is assigned the value of one (1) and compared to the other category, assigned the value of zero. Exponents of the logistic regression coefficients are interpreted as odds ratios. Ratios less than 1.0 indicate an inverse relationship between independent and dependent measures, and ratios greater than 1.0 indicate a positive relationship. Odds ratios at or near 1.0 indicate no relationship. The chi-square statistic was used to estimate the statistical significance of the coefficients. The logistic regression procedure, in addition, controls the variation accounted for by other variables in the model when computing coefficients for each nonzero value of independent variables.

In the first set of analyses logistic regression models were estimated for each indicator of violence where independent variables were age, race, education, and several indicators of alcohol disorder. Because alcohol has been shown to be selectively associated with violence in previous work and in earlier analyses of the data used here and because a majority of the inmates who were diagnosed as having a mood disorder also had an alcohol disorder, estimation of the strength of the mood disorder/violence relationship requires separate examination of the variation resulting from different alcohol disorder symptom clusters/groups.

INDEPENDENT VARIABLES

Six alcohol disorder symptom groups were developed by Bailey and Collins using theoretically directed factor analysis. The first of these composite measures represents pathological/excessive use of alcohol and is composed of single measures such as thinking one's self an excessive drinker, drinking as much as a fifth of liquor in one day, drinking seven or more drinks every day for 2 weeks or seven drinks at least once a week for a couple of months, and going on binges or benders. A second measure represents problems meeting responsibilities because of drinking and is composed of items measuring job/school troubles, lost job/kicked out of school, neglected responsibilities, and inability to do ordinary work without drinking. The third measure, negative sanctions for drinking, is composed of items representing family, friend, or professional objections to drinking, often in trouble for driving while drinking, and arrested for drinking.

The next two composite measures represent symptoms of alcohol dependence of varying degrees of seriousness. The first of these measures is composed of the less serious symptoms--wanting to stop drinking, structured drinking in order to control the amount, drinking upon awakening, blackouts, shakes, stomach trouble, and memory trouble. Such symptoms of dependence are a mixture of behavioral, psychological, and

physical indicators of alcohol dependence. The measure representing more serious symptoms is composed of physical indicators of dependence--fits or seizures, delirium tremens, hallucinations, and tingling or numbness. Finally, an alcohol-related disorders measure representing the presence of liver disease/yellow jaundice, or inflammation of the pancreas/pancreatitis is the sixth problem drinking indicator.

The mood disorder measures include DIS-DSM-III lifetime diagnoses for dysthymia and recurrent major depression, and the occurrence of manic and depression symptoms. Dysthymia is a chronic depressed mood lasting for at least 2 years. Recurrent major depression involves the occurrence of two or more major depressive episodes. Too few individuals received diagnoses of single episode major depression or bipolar disorder to support separate analyses of the relationship of these disorders to violence. The analysis reported below does examine the relationship of manic and depressive symptoms to violence.

Because the data analyzed here do not allow the time of occurrence of mood disorders and symptoms to be placed accurately relative to the time of occurrence of the violence measures, the causal nature of the observed mood disorder/violence relationships cannot be specified. Using the lifetime mood disorder variable (as opposed to, say, the last 6 months), the analysis minimizes the likelihood that the occurrence of the disorder or symptoms occurred after the occurrence of violence. Nonetheless, the temporal order of occurrence of the mood disorder and violence measures is unknown. Consequently, findings will be interpreted in an associational rather than a causal framework.

RESULTS

Effects of the Disorders

Table 5 shows the results of six logistic regression models where the effects of age, race, education, and six alcohol disorder symptom groupings are controlled to allow estimation of the relationship of mood disorders to the various measures of violence. The mood disorder measures include the DIS-DSM-III diagnoses of dysthymia, recurrent major depression, and two manic symptom indicators. Individuals who have the disorder or symptom are scored one, and those who have no such diagnosis or symptom are scored zero.

Those age 25 or older are more likely than younger inmates to have been arrested for an expressive violent offense at some time in their lives and are less likely to have an instrumental-violence arrest history. These older inmates are most likely to be currently incarcerated for an expressive violent offense. In five of the six violent categories, white offenders are less likely than nonwhite offenders (mostly blacks) to have a violence history. Those with less than a high school education are less likely than better educated persons to have an arrest history for expressive violence.

Table 5 also indicates statistically significant relationships between a number of alcohol disorder indicators and violence. Chapter 7 discusses

Table 5. Odds Ratios of Dysthymia, Recurrent Depression, and Manic Symptom Count Measures on Measures of Violent Behavior

Predictor Variables	Arrested for Violent Offense in Last Year	Ever Arrested for Violent Offense		Incarcerated for Violent Offense		Multiple Adulthood Fighting
		Expressive	Instrumental	Expressive	Instrumental	
Age 25 or older	0.87	1.40*	0.73+	1.35+	0.74	1.01
White	0.46***	0.57***	0.35***	0.70+	0.33***	1.25
High school or more	0.83	0.69*	0.79	0.80	1.25	0.90
Dysthymia	1.39	0.85	3.46**	0.80	2.97*	1.92+
Recurrent depression	1.01	0.96	0.84	1.27	0.73	0.90
One manic symptom	1.13	1.03	1.17	1.52+	1.32	1.14
Two or more manic symptoms	1.52+	1.14	0.89	1.62+	1.26	1.55*
Less serious symptoms of dependence	0.99	0.93	0.82	0.77	1.35	1.17
Trouble meeting responsibilities	1.31	1.46+	1.55+	0.76	0.94	1.54*
Alcohol-related physical disorders	1.95	1.45	2.20	4.26**	0.67	0.53
Negative sanctions	1.49*	1.51*	0.93	2.14***	0.90	1.51*
Pathological/ excessive use	0.94	0.68*	1.60*	0.64+	1.01	1.90***
More serious symptoms of dependence	2.25**	1.36	0.39*	1.72	1.21	0.59+
n =	(1120)	(1125)	(1125)	(1125)	(1125)	(1120)

\+ p<.10
* p<.05
** p<.01
*** p<.001

these relationships in detail so they are only summarized here. Briefly, the data show that some aspects of problem drinking are directly associated with violence while others are not, and there is even evidence of an inverse relationship between pathological/excessive use and expressive violence. In general, though, there is evidence of a direct relationship between problem drinking and violence, and the findings indicate the relationship is stronger for expressive than for instrumental violence.

Table 5 shows that, with demographic and alcohol disorder variables controlled, dysthymia is directly and strongly associated with arrest and incarceration for robbery and (below the .10 probability level) with adulthood fighting. Inmates receiving a dysthymia diagnosis were three-and-one-half times more likely than those without such a diagnosis to have an arrest record for robbery, and these same individuals were three times more likely than others to be currently incarcerated for robbery.

On the surface, the dysthymia/robbery relationship is surprising. Robbery is aggressive and dangerous (for both offender and victim) offense, always involving the threat or actual use of force, and often involving a weapon, injury, or death. The victim usually sees the offender who may, thus, be able to identify him. The common image of a robber as among the most predatory of offenders (Chaiken and Chaiken, 1982; Petersilia et al., 1978) does not comport with that of a dysthymic individual who is typically characterized as having persistent depressed mood with a low energy level. At a superficial level the dysthymia/robbery relationship seems counterintuitive. This is discussed further in the Discussion section.

Because dysthymia is often accompanied by a personality disorder (APA 1987), an indicator of antisocial personality (ASP) disorder[5] was included in the logistic regression models. It was reasoned that ASP could vary directly with involvement in robbery, and that the co-occurrence of ASP with dysthymia might account for the relationship observed between dysthymia and robbery. When the ASP disorder variable was included in the models, however, the strong relationship between dysthymia and robbery was

---

5/ The DIS diagnostic software includes the following symptoms in the antisocial personality (ASP) disorder diagnosis: truancy, having been expelled/suspended, arrested, run away from home, lying, sexual intercourse, drunk or drug use, stealing, vandalism, poor grades, trouble at school, starting fights for individuals younger than age 15; and job troubles, negligent toward children, nontraffic arrest (such as prostitution, pimping, drug sales), marital/relationship problems, violence, trouble with debts, vagrancy, lying, and traffic offenses for those 18 or older.

Because this disorder measure was intended to predict measures of violent behavior, the symptoms of starting fights before age 15 and violence after age 18 were not included in the ASP measure used in these models. If these symptoms had been included, the effect of ASP on the violent behavior measures may have been largely a lagged effect of violence at one time predicting violence at a later time. Our interest was in predicting violence using the complex of nonviolence symptoms constituting the ASP disorder.

not diminished (data not shown). Other factors not considered here may account for the dysthymia/robbery relationship, but the presence of ASP disorder with dysthymia does not.

To examine the possibility that the dysthymia/violence findings shown in Table 5 might be affected by the co-occurrence of dysthymia and alcohol disorder symptoms, several dysthymia/alcohol disorder interaction variables were tested in additional logistic regression models (results not shown). When these variables were included in models with the main effects dysthymia variable, the latter continued to account for significant variation in current incarceration for instrumental violence and adulthood fighting. The statistically significant relationship between dysthymia and having a lifetime arrest for instrumental violence does disappear when the dysthymia/problem drinking variables are included in the model. The analyses also showed that individuals with a dysthymia diagnosis and the problem drinking symptom referred to as "trouble meeting responsibilities" were especially likely to have an arrest history for robbery and to report adulthood fighting.

The analyses using ASP/dysthymia and problem drinking/dysthymia interaction effects did not shed much light on the interpretation of the dysthymia/robbery relationship. With the one exception noted, the direct dysthymia/robbery relationship is still observed, suggesting the Table 5 findings can be viewed with confidence. Table 5 shows there is no relationship between recurrent depression and the violence measures employed here.

Effects of the Symptoms

Turning to the findings for mood disorder symptoms, Table 5 shows there is no relationship below the .05 level between one symptom of mania and violence. Inmates with two or more symptoms of mania are somewhat more likely ($<.10$) than others to have an arrest in the last year for a violent offense and to be currently incarcerated for an expressive violent offense. There is also a relationship between two or more manic symptoms and adulthood fighting.

Table 6 shows the results of testing the relationship between mood disorder and violence in an alternative way. The number of different depression symptoms is used instead of mood disorder diagnostic categories in the logistic regression models. In the analysis, individuals with one symptom of depression are compared to those with no such symptoms, those with two or three symptoms are compared to those with no symptoms, and those with four or more symptoms are compared to those with no symptoms. Thus, individuals who had symptoms but who may not have satisfied the criteria for a diagnosis of major depression are counted as symptomatic.

Most notably, Table 6 indicates depression symptoms are directly associated with multiple adulthood fighting events. There is some slight evidence that the relationship may be linear because the odds ratios are higher for those with four or more symptoms than for those with fewer symptoms. The difference in odds ratio magnitudes is not large, however,

Table 6. Odds Ratios of Affective Disorder Symptoms Counts and Alcohol Disorder Measures on Measures of Violent Behaviors

Predictor Variables	Arrested for Violent Offense in Last Year	Ever Arrested for Violent Offense		Incarcerated for Violent Offense		Multiple Adulthood Fighting
		Expressive	Instrumental	Expressive	Instrumental	
Age 25 or older	Ø.88	1.39*	Ø.77	1.35+	Ø.77	1.Ø4
White	Ø.46***	Ø.57***	Ø.36***	Ø.68*	Ø.33***	1.22
High school or more	Ø.83	Ø.68*	Ø.8Ø	Ø.79	1.25	Ø.9Ø
One symptom of depression	Ø.84	Ø.86	Ø.95	Ø.84	Ø.9Ø	1.43*
2-3 symptoms of depression	Ø.87	Ø.99	Ø.6Ø*	1.3Ø	Ø.66	1.35+
Four or more symptoms of depression	1.Ø8	1.Ø3	Ø.93	1.38	1.18	1.68*
One manic symptom	1.13	1.Ø2	1.2ð	1.39	1.34	Ø.98
Two or more manic symptoms	1.51+	1.Ø8	1.1Ø	1.38	1.31	1.31
Less serious symptoms of dependence	Ø.99	Ø.93	Ø.84	Ø.74	1.35	1.14
Trouble meeting responsibilities	1.31	1.46+	1.55+	Ø.73	Ø.93	1.49*
Alcohol-related physical disorders	2.Ø1	1.4Ø	2.51+	4.22**	Ø.76	Ø.56
Negative sanctions	1.51*	1.51*	Ø.96	2.14***	Ø.92	1.52*
Pathological/ excessive use	Ø.96	Ø.68*	1.66*	Ø.63+	1.Ø5	1.86***
More serious symptoms of dependence	2.18**	1.38	Ø.38*	1.7Ø	1.14	Ø.55*
n =	(1120)	(1125)	(1125)	(1125)	(1125)	(1120)

+ p<.10 ** p<.Ø1
* p<.Ø5 *** p<.ØØ1

suggesting it is the presence of depression symptoms per se that is important, not the number of different symptoms that are manifested.

Table 6 shows that the relationship between multiple mania symptoms and violence observed in Table 5 is weakened or eliminated when depression symptom counts are used in the models in place of the mood disorder diagnostic categories. The relationship (<.10 level) between two or more mania symptoms and recent arrest for a violent offense remains the same in the Table 6 model as in the Table 5 models, but the findings are weaker than those shown earlier.

Summary

Figure 1 summarizes the modeling results for mood disorders and symptoms and violence. One finding is clear; a dysthymic diagnosis is associated with arrest and incarceration for robbery and involvement in multiple incidents of fighting since age 18. The inclusion of ASP in the models does not weaken the relationship although one of the dysthymia/alcohol disorder symptom categories does eliminate the relationship between the main effects dysthymia variable and having an arrest history for robbery.

The evidence for a relationship between manic symptoms and violence is weak. Although the relationship between two or more manic symptoms and arrest for a violent offense in the last year is seen in both Tables 5 and 6, when the depression symptom variables are used (Table 6) in place of the mood disorder variables, several previously significant odds ratios become statistically nonsignificant. Finally, there is clear evidence of a direct relationship between depression symptoms and adulthood fighting as well as evidence of an inverse relationship between the presence of two or three depression symptoms and an arrest history for robbery. Evidence of a relationship between mood disorders and symptoms and arrest and incarceration for expressive violence is also weak or nonexistent.

DISCUSSION

The analyses reported here attempted to determine whether there is evidence of a relationship between mood disorders and violent behavior. Past research has been inconsistent, sometimes finding a relationship between the two and sometimes finding no relationship. It was hoped that by using specific mood disorder categories, by controlling for other sources of variation (demographic, problem drinking, ASP), by using symptoms as well as disorder diagnoses, and by using multiple measures of violence, unambiguous inferences would be possible. This effort has met with only limited success.

In a number of ways the findings reported here mimic earlier studies of the relationship between mood disorders and violence. The evidence of a direct relationship is inconsistently observed and statistically weak, and only some aspects of the disorder appear relevant. Because the methodology used here controlled for the effects of a number of known correlates of violence, the mood disorder findings can be viewed with some confidence.

Predictor Mood Disorder	Violence Indicator					
	Arrested for Violent Offense in Last Year	Ever Arrested for Violent Offense		Incarcerated for Violent Offense		Multiple Adulthood Fighting
		Expressive	Instrumental	Expressive	Instrumental	
Dysthymia	No	No	Yes	No	Yes	Yes
Recurrent depression	No	No	No	No	No	No
One manic symptom	No	No	No	Incon-sistent	No	No
Two or more manic symptoms	Yes	No	No	Incon-sistent	No	Incon-sistent
One depression symptom	No	No	No	No	No	Yes
2-3 depression symptoms	No	No	Yes (Inverse)	No	No	Yes
4 or more depres-sion symptoms	No	No	No	No	No	Yes

Note: Cell entries refer to the presence or absence of a relationship between the mood disorder variables and the various violence indicators, controlling for the effects of the other variables included in the models presented in Table 1 and 2.

Figure 1. Summary of modeling findings for the relation of mood disorders and symptoms to violence indicators.

The relationship of dysthymia to arrest and incarceration for robbery and to adulthood fighting are fairly robust but difficult to interpret. Persistent depressed mood, the major affective feature of dysthymia, does not seem on the surface to be consistent with involvement in the aggressive and risky offense of robbery and adulthood fighting. Two points should be made in this regard. First, as discussed earlier, the data do not allow for characterization of the temporal relationship of dysthymia to arrest or incarceration for robbery and fighting. That is, we cannot tell from these data whether these activities preceded or followed the onset of dysthymia. The absence of temporal data limits the inferences that can be drawn.

Second, known features of robbery offending suggest a possible explanation for the disproportionate presence of dysthymia among those arrested and incarcerated for this offense. Robbery commonly involves multiple offenders. National data indicate that almost half (48.5 percent) of robbery incidents in the United States included two or more offenders, and 73 percent of identified robbery offenders offended with one or more accomplices (Reiss, 1988). In his analysis of co-offending, Reiss also makes the point that some offenders tend to be recruiters of accomplices and others to be recruited, "...some offenders actively recruit co-offenders" (Reiss, 1988:148). The findings shown earlier may reflect the susceptibility of dysthymic individuals to recruitment as accomplices in robbery. The lack of data precludes testing that hypothesis here, but the image of a dysthymic individual as a recruited accomplice rather than a lone actor or the lead offender comports better with the typical robbery features than the reverse pattern. Exploring the role of the dysthymic offender must be left for future work.

The logistic regression findings shown in Table 6 indicated that one or more depression symptoms were directly associated with adulthood fighting. Further complicating interpretation of the depression symptom/violence relationship is the finding that two or three depression symptoms were inversely related to having an arrest record for robbery. Although the adulthood fighting and robbery findings are not necessarily inconsistent with each other because fighting is likely to involve expressive violence and robbery is likely to be instrumental violence, no overall interpretation is suggested by the analyses that focused on depression symptoms rather than the mood disorder categories. The analyses again suggest that any depression symptom/violence relationship is not easily characterized.

There are important limitations to the findings reported here. The study population consists of incarcerated adult male felons and, thus, is not representative of the general population. On the other hand this population accounts for a disproportionate amount of violence in the United States. The measures used also limit the confidence that can be placed in findings. The mood disorder categories and symptoms and some of the violence indicators are based on self-reports from the study subjects. No direct observation of behavior measures or clinical assessments were used. The measures were carefully developed, but they are self-reports nonetheless. Moreover, some mood disorders such as bipolar disorder could not be analyzed because too few subjects were diagnosed as having this disorder.

It appears certain that any direct relationship between mood disorders and violence is complex, probably involving multiple individual and situational characteristics. The analyses carried out with the data used in this chapter illustrate the likely complexity of the mood disorder/violence relationship. Models were analyzed to examine whether there are interactive effects between mood and alcohol disorders and violence. Several mood disorder/problem drinking interaction effects were tested in regression models with the violence measures. Several of the dysthymia/problem drinking interaction terms produced statistically significant regression coefficients. As with other attempts to illuminate the relationship of mood disorder and violence in this chapter, though, no interpretation was suggested by the findings. One thing seems clear: understanding whether and under what circumstances mood disorders are related to violence will require complex conceptual and analytic models.

In general, the results of the current and previous work do not suggest that mood disorders are, by themselves, an important factor in violence. In the study of violence, then, mood disorders should probably be viewed as important secondarily or only in the company of other factors.

It is not apparent why there is a stable relationship between dysthymia and robbery within this sample of inmates. A logical next step in attempting to understand the mood disorder/violence relationship, then, would be to focus on the dysthymia-robbery relationship to determine whether the relationship is observed more widely and to clarify why the relationship is observed.

6. TRAUMATIC STRESS DISORDER AND VIOLENCE

Only in the recent 20th century have the behavioral sciences focused on the subsequent adjustment of individuals who experience traumatic events. The most attention has been paid to combat veterans, probably because their reactions to their war experiences are the most serious and visible. Shell shock and battle fatigue are terms used to describe the adverse combat-related psychological problems of World Wars I and II veterans.

The American Psychiatric Association (APA) developed a systematic psychiatric disorder classification system after World War II. In that system, "combat neurosis" described combat-related adjustment problems (APA, 1952). Diagnostic criteria were clearly specified, and the condition was renamed "post-traumatic stress disorder" (PTSD) in the third edition of the APA manual and its subsequent revision (APA, 1980, 1987). The diagnosis was more clearly delineated and broadened to apply to reactions to all kinds of traumatic precipitating events "...outside the range of usual human experience ...that would be markedly distressing to almost anyone" (APA, 1987: 250). Thus, both combat and non-combat experiences (such as witnessing or being the victim of physical violence) were recognized as potential precipitators of PTSD.

The revised third edition of the APA Diagnostic and Statistical Manual indicates that those diagnosed as suffering from PTSD often report higher levels of aggression than in their pre-morbid state. This aggression may range from mild (e.g., irritability) to severe (e.g., outbursts of anger without provocation). Although a tendency to act violently is not explicitly identified as a criterion for PTSD diagnosis, the clear implication is that those with PTSD may be more likely to act violently. Individuals who experienced or committed violent acts in combat are thought to be at especially high risk of explosions of aggressive behavior.

PAST RESEARCH

Some past research has focused on the relationship of war trauma to subsequent involvement in violence. Van Putten and Emory (1973) noted the presence of episodic explosive violence in four of five cases of "traumatic neuroses" in Vietnam returnees. Escobar et al. (1983) found that 20 of a sample of 41 Hispanic Vietnam veterans clinically diagnosed as suffering from PTSD displayed violent behavior as an "associated symptom." Wilson and Zigelbaum (1983) found a relationship between combat experience, PTSD symptoms, and assault in a volunteer sample of 114 Vietnam veterans.

Yager, Laufer, and Gallops (1984), in a study of 1,342 American men who were draft eligible during the Vietnam War found that violent experiences in Vietnam were associated with later stress symptoms, arrests, and convictions.

A recent national survey of Vietnam veterans provides some evidence of a relationship between PTSD and violence. Kulka, Schlenger, Fairbank, Hough, Jordan, Marmar, and Weiss (1987) compared veterans who had served in the Vietnam war zone with Vietnam era veterans who served elsewhere. A significant relationship was found between levels of lifetime PTSD symptoms and scores on a seven-item hostility index for males who had served in the Vietnam war zone, and a direct relationship was found between PTSD symptom scores and an eight-item violence index for both males and females.

Not all the evidence is consistent with a PTSD/violence relationship. Boman (1986) found that Vietnam veterans with PTSD did not differ in involvement in impulsive violence from Vietnam veterans without PTSD. In two studies of incarcerated veterans, no relationship was found between Vietnam veteran status and incarceration for a violent crime (Bureau of Justice Statistics, 1981; Shaw, Churchill, Noyes, and Loeffelholz, 1987). The Shaw et al. study found that, among Iowa state prison inmates, veterans with PTSD were no more likely than veterans without PTSD to have been incarcerated for a violent crime.

A number of studies have focused on the use of PTSD as a legal defense against charges of violent crime (Apostle, 1980; Grant and Coons, 1983; Marciniak, 1986; Sparr, Reaves, and Atkinson, 1987). Defendants have sometimes been held <u>not</u> to be responsible for their violent actions due to PTSD.

There is virtually no work that studies the relationship of PTSD to subsequent violence in individuals whose precipitating traumatic stressors are not related to combat experiences. Some studies have documented adjustment problems in rape victims (Burgess and Holstrom, 1979; Kilpatrick, Resick, and Veronen, 1981; Steketee and Foa, 1987) or police officers involved in shootings (Stratton, Parker, and Snibbe, 1984). These studies, however, have not focused on the subsequent aggression proclivities of those who have been exposed to traumatic events.

This chapter examines the relationship between PTSD and several indicators of violence in a sample of male prison inmates. It extends the scope of previous work by investigating whether there is evidence for a PTSD/violence relationship in a group where the precipitating traumatic event for most was not associated with combat. Moreover, only 16 percent of the inmate sample ever served on active duty in the military, and more than two-thirds of those diagnosed with PTSD are non-veterans. The multiple correlates of violence included in multivariate models permit an assessment of PTSD effects on violence when a number of other relevant factors are controlled. Finally, temporal analyses focus on the important question of whether PTSD symptoms occurred before involvement in violence, thus addressing the possible causal relationship of PTSD to violence.

APPROACH

Sample and Data Collection

The sample used in the analyses reported here are 1,140 male felons recently admitted from the community to North Carolina prisons between March and June 1983. Three different sets of data were collected for each subject.

First, the inmates responded to the Diagnostic Interview Schedule (DIS) (Version III) to measure the symptoms necessary for DSM-III diagnoses. Other questions, including those seeking demographic and criminal history information, were added to the interview schedule. Professional survey research interviewers not affiliated with the North Carolina Department of Correction conducted the interviews in private or near-private settings. Interviews averaged approximately 1.5 hours. Interviewers were trained during five days in class with additional training at the prisons.

Second, detailed data on criminal history, type of offense or offenses resulting in current incarceration, and current sentence terms were collected for each subject from North Carolina Department of Correction records.

Third, North Carolina State Bureau of Investigations criminal history records were collected for each subject. Cumulative records of officially recorded police contacts or arrests include information on date, place, and type of offense for arrests occurring in North Carolina.

Of 1,327 inmates sampled, 10.2 percent refused to participate, 2.6 percent were transferred to other institutions before the interview could be completed, and 0.6 percent were not interviewed for other reasons such as physical or mental incapacitation or a language barrier. Of the remaining 1,149 subjects, nine cases were dropped due to erroneous interviews or inconsistent data. Those not interviewed tended to be older, to be nonwhite, and to have more serious criminal histories than those interviewed. Of those interviewed, 52.1 percent were age 25 or older, 45.1 percent were white, and 25.8 percent had at least a high school education.

Although the findings from this sample are not generalizable to the entire U.S. population, two factors indicate that this sample is appropriate for examining the relationship between PTSD and subsequent violence. First, the demographic profile of the North Carolina inmate sample is similar to that of state prison inmates nationally (Innes, 1988). Findings, therefore, may be generalizable to the U.S. state prison inmate population. Second, a sample of prison inmates is appropriate for examining questions about violent behavior because inmates are responsible for a disproportionate amount of serious interpersonal violence that occurs in the U.S. Even though most violence is not followed by incarceration, the more serious the violence, the more likely it is to come to the attention of police and to result in conviction and incarceration. In addition, the prison inmate sample sizes will support multivariate analyses of violent behavior and PTSD, both rare events in the general population.

Finally, as indicated above, it may be enlightening to study the PTSD/violence relationship in a non-veteran sample.

Measurement of PTSD

The independent variable of most interest in these analyses is PTSD. The disorder is measured on a lifetime basis. To receive a DIS/DSM-III diagnosis for PTSD, subjects must have experienced at least four symptoms since age 18 that resulted from one type of traumatic stressor experience. The types of traumatic stressor experiences are combat, a serious accident, a physical attack, seeing someone hurt, some other trauma, a threat or close call, a natural disaster, or some other experience. The experience must have caused distressing intensive recollections of the trauma such as nightmares or behavior commensurate with reliving the experience. The subject must also show interpersonal withdrawal or emotional numbing symptoms such as a loss of interest in previously important activities or a lessening of feeling for people about whom the subject previously cared. Finally, the subject must have developed two or more of the following symptoms subsequent to the traumatic stressor: either feeling the need to stay on guard or being easily startled, having trouble sleeping, feeling ashamed of being alive, having trouble concentrating, or avoiding doing things reminiscent of the experience. Only 26 subjects met this relatively strict criteria for diagnosis of PTSD--a prevalence of 2.3 percent.

The second PTSD measure is simply a count of the possible PTSD symptoms (nightmares, loss of interest, lessening of feeling, etc.), ranging from zero (no symptoms reported) to nine. This measure includes a larger proportion of the sample and was created for use in these analyses to achieve greater analytical flexibility with a larger subsample size (795 subjects reported one or more symptoms) to examine the relationship between PTSD symptoms and violence in the absence of a full diagnosis, and to determine whether the number of reported PTSD symptoms was significantly associated with violence.

The third PTSD measure uses the age of the first of any of the PTSD symptoms listed above to examine the temporal order of PTSD symptoms and violent behavior. The subject's age was subsequently added to his year of birth to determine the relationship of the year of first symptom to the year of first arrest for a violent offense.

Independent Variables

The independent variables included the PTSD disorder and symptom measures described above, demographic factors, and a measure of problem drinking. Problem drinking is known to be associated with involvement in violence (Collins, forthcoming). A measure developed in a previous paper (Bailey and Collins, forthcoming) using theoretically directed factor analysis on 28 DSM-III alcohol disorder symptoms was modified for use in the violent behavior models in addition to the PTSD disorder and symptom measures. A composite measure was created by summing on six factors derived from the 28 symptoms: pathological/excessive use, problems meeting responsibilities due to drinking, negative sanctions for drinking, less serious and more serious symptoms of alcohol dependence, and having an

alcohol-related physical disorder such as liver disease. The problem drinking measure, thus, ranges in value from zero to six; the mean problem drinking score for the inmates was 1.8.

Finally, three demographic factors known to be associated with violent behavior (Blumstein, Cohen, Roth, and Visher, 1986; Innes, 1988; FBI, 1988; Wolfgang, Thornberry, and Figlio, 1987) were included in the models as control variables. The background measures are age, race/ethnicity, and education. The measures were dichotomized for inclusion in the logistic regression models with those age 25 or older being compared to younger subjects, whites being compared to nonwhites, and those with at least a high school education being compared to subjects with less education.

Dependent Variables

Six indicators of violence were used in the analyses:

1. multiple incidents of fighting since age 18,
2. arrest for a violent offense in the year before the interview,
3. currently incarcerated for an expressive, violent offense,
4. currently incarcerated for robbery,
5. a lifetime arrest history for an expressive violent offense, and
6. a lifetime arrest history for robbery.

In the interviews, 41.2 percent of subjects reported having been in more than one fight since age 18 that came to swapping blows with someone other than a wife/partner. Nearly 29 percent of subjects reported one or more arrests in the year before the interview for a violent offense such as homicide, rape, assault, or robbery. These two variables are based on self-reported items.

The third and fourth measures were based on data from the Department of Correction. Current incarceration for homicide, rape, or aggravated assault is distinguished from a current incarceration for robbery because the first set of offenses usually involves expressive (emotional) violence, and robbery is usually instrumental (acquisitive) violence. Almost 14 percent of subjects were currently incarcerated for acts of expressive violence and 12 percent for robbery.

Lifetime arrests for homicide, rape, and aggravated assault and robbery, the last two measures, were created from the State Bureau of Investigation arrest histories. Violent arrests were grouped in the same manner as the current incarceration measures. Thirty-one percent of the sample had at least one lifetime arrest for an expressive violent offense, and 16.8 percent had at least one arrest for robbery.

These six violent behavior measures represent differences in the types of violence (expressive, instrumental, or undifferentiated), seriousness and official reaction to the violence (unpunished fighting, arrests, incarcerations), source of information (self-reports or official records), and periods in the subjects' lifetimes (arrests only in the last year, lifetime arrests, fighting only in the adulthood years). Having various

indicators of violence allows assessment of the PTSD/violence relationship in multiple ways.

The frequency distributions of these violent behavior measures were positively skewed with the greatest proportion of cases having the value of zero. Consequently, the measures were dichotomized with the categories of no arrests, incarcerations, or incidences of fighting receiving a value of zero, and one or more arrests, incarcerations, or incidences receiving a value of one (1). Logistic regression, a statistical procedure appropriate for multivariate modeling with dichotomized dependent variables, is used to estimate effects.

RESULTS

PTSD Disorder and Symptom Prevalences

At some time in their lives, 2.3 percent of the inmate sample (n=26) satisfied the DIS/DSM-III criteria for PTSD. The distribution of the types of precipitating traumatic events among those with and without the disorder is shown in Table 7.

The most frequent precipitating traumatic event for the inmates is seeing someone hurt or killed; more than half of those with a PTSD diagnosis, and 5.7 percent of those without a diagnosis reported such an event. Thirty-one percent of those who satisfied the diagnostic criteria for PTSD and less than one percent of those who did not experienced combat trauma. Approximately one in five of those with the disorder reported a traumatic serious accident, or said they were physically attacked. Other kinds of precipitating traumatic events occurred infrequently. Many individuals reported more than one type of precipitating event. A much higher percentage of those with the disorder reported all kinds of traumatic events with the exception of the "other" category where the difference is not large.

The maximum possible number of symptoms is nine. At least four symptoms are required to receive the diagnosis. Table 8 shows the prevalence of PTSD symptoms for those with a PTSD diagnosis and for the entire sample. The mean number of PTSD symptoms for the entire sample is 0.7. Some individuals reported PTSD symptoms but did not satisfy the diagnostic criteria.

Column one of Table 8 shows the prevalence of the various symptoms among those with PTSD. More than 80 percent of those with a diagnosed disorder reported: nightmares or flashbacks, being jumpy and easily startled, having trouble sleeping, and having less interest in activities that had previously been important. With the exception of feeling ashamed of still being alive, a majority of those with PTSD report each of the symptoms.

Column two of Table 8 shows symptom prevalences for the entire sample. PTSD symptoms are common in this sample, even among those who do not receive a PTSD diagnosis. Almost 14 percent of the sample reported nightmares or flashbacks as a result of traumatic events. Eleven percent

Table 7. Type of Precipitating Traumatic Event Among Inmates

Type of Precipitating Event	Reporting Event: With PTSD Diagnosis %	With PTSD Diagnosis n	Without PTSD Diagnosis %	Without PTSD Diagnosis n
Combat	30.8	8	0.9	10
Physical attack	19.2	5	2.6	28
Serious accident	23.1	6	4.2	46
Seeing someone hurt/killed	53.8	14	5.7	62
Other trauma	7.7	2	1.5	16
Threat or close call	7.7	2	2.6	28
Natural disaster	0.0	0	0.1	1
Something else	7.7	2	5.0	55
		39		246

Note: Several respondents experienced more than one traumatic event. Therefore, the percentages in the first column total more than 100 percent.

Table 8. Inmates Reporting PTSD Symptoms

Type of PTSD Symptom	Symptom Prevalence Among Inmates With a PTSD Diagnosis n=26	Symptom Prevalence Among Entire Sample of Inmates n=1,125
Nightmares, flashbacks	100.0%	13.6%
Jumpy and easily startled	80.8	11.0
Hypervigilance	69.2	8.2
Trouble sleeping	84.6	11.1
Trouble concentrating	65.4	6.8
Less feeling for others	57.7	4.4
Less interest in activities	84.6	5.9
Ashamed of still being alive	46.2	2.8
Avoided reminders of trauma	73.1	7.2
Mean Number of Symptoms	6.6	0.7

of the sample reported being jumpy or easily startled or having trouble sleeping after traumatic events. All of the other symptoms were reported by less than 10 percent of the inmates. Twenty-five percent of the inmates reported at least one symptom. This is higher than the PTSD symptom prevalence of 15 percent among males in a community sample reported by Helzer, Robins, and McEvoy (1987).

Modeling of PTSD and PTSD Symptoms

To estimate the relationship of PTSD and its symptoms to violence, two sets of six logistic regression models were analyzed. In the first set of models, the six indicators of violence were regressed on the PTSD diagnostic variable (0 = no diagnosis, 1 = lifetime PTSD diagnosis), three demographic variables (age, race, education), and the composite measure of problem drinking. The demographic and problem drinking variables are known to be associated with violent behavior as discussed earlier. Including these variables in models with PTSD tests the unique capacity of PTSD to account for violence when the variation accounted for by a number of known correlates of violence is controlled.[6]

In the second set of six logistic regression models the same six violence indicators and the same set of demographic and problem drinking variables were included, but a PTSD symptom count variable was substituted for the PTSD diagnosis variable. These models test whether PTSD symptoms and symptom frequency in the absence of a full PTSD diagnosis are associated with violence.

Table 9 shows the logistic regression odds ratios for the demographic factors, the problem drinking composite, PTSD diagnosis, and PTSD symptom variables for each of the violence indicators. The odds ratios are the exponents of the logistic regression coefficients and can be interpreted as a greater or lesser likelihood of involvement in violence for the independent variable categories coded one compared to those coded zero. Odds ratios significantly higher than 1.0 indicate an elevated risk; odds ratios significantly lower than 1.0 indicate a reduced risk. Odds ratios not significantly different from 1.0 indicate no relationship between independent and dependent variables.

Race is the demographic factor most consistently related to violence; whites are less likely than nonwhites (mostly blacks) to have arrest and incarceration histories for violence. Whites, however, are more likely than nonwhites to be involved in multiple incidents of fighting since age 18.

6/ The 26 individuals who fully satisfied the criteria for a lifetime PTSD diagnosis are distributed across all of the independent and dependent variable categories. Results should be interpreted cautiously, however, because the number of subjects with a PTSD diagnosis is low. The PTSD results are stable in models including different independent variables, however, and when the models are changed by eliminating independent variables, the significant PTSD/violence relationships are not changed.

Table 9. Summary of Logistic Regression Odds Ratios for Demographic Characteristics, PTSD and PTSD Symptoms

	Current Incarceration for:		Arrest History for:			
	Homicide, Rape, Assault	Robbery	Homicide Rape, Assault	Robbery	Arrest for Violence in Last Year	Multiple Adulthood Fighting
DIAGNOSIS MODELS (n=1125)						
Age (25+)	1.48*	.76	1.45**	.73+	.90	1.00
Race (white)	.62*	.33***	.57***	.36***	.42***	1.29+
Education (HS+)	.76	1.28	.67*	.85	.80	.95
Problem Drinking	1.08	1.07	1.10*	1.11*	1.26***	1.38***
PTSD (Diagnosis)	4.85***	1.28	2.08+	1.29	6.78***	1.28
SYMPTOM MODELS (n=1125)						
Age (25+)	1.47*	.76	1.45*	.73+	.90	.99
Race (white)	.67*	.33***	.55***	.37***	.45***	1.30*
Education (HS+)	.79	1.29	.68*	.86	.82	.95
Problem Drinking	1.05	1.07	1.09*	1.11*	1.23***	1.37***
No. PTSD Symptoms (0-9)	2.11***	.94	1.18	.96	1.87***	1.32+

*statistically significant p<.05.
**statistically significant p<.01
***statistically significant p<.001.
+statistically significant p<.10.

Age is directly associated with the likelihood of being currently incarcerated for and having an arrest history for homicide, rape, or assault; older inmates are more likely to have such records. Younger inmates, however, are more likely to have a robbery arrest history. Age is not a significant correlate of a current incarceration for robbery nor is it associated with a recent arrest history for violence or adulthood fighting.

Those with at least a high school education are less likely than those with less education to have an arrest history for homicide, rape, and assault.

The relationship of problem drinking to violence found in earlier analyses of the data (Bailey and Collins, forthcoming) can be summarized as follows:

- the data show evidence of a positive relationship between problem drinking and violence, and this relationship is stronger for expressive than for instrumental violence;
- the strength of the problem drinking/violence relationship is not generally strong when variation accounted for by other factors is controlled;
- some analyses show no evidence of a relationship between problem drinking and violence.

The problem drinking variable is included in the current analyses primarily to control for the problem drinking/violence relationship in the estimation of PTSD effects.

The top section of Table 9 shows that those who received a PTSD diagnosis are much more likely than those who did not receive such a diagnosis to (1) be currently incarcerated for homicide, rape, or assault, (2) have an arrest history for one of these offenses, and (3) have had an arrest for a violent offense in the year before their incarceration. The odds ratio for the recent arrest variable is especially notable. Individuals with PTSD diagnoses are 6.78 times more likely than those without such a diagnosis to have been arrested for a violent offense in the year before their imprisonment. The odds ratio for current incarceration for homicide, rape, or assault for individuals with a PTSD diagnoses is also high (4.85), indicating PTSD is strongly related to this variable.

The bottom section of Table 9 shows the findings when PTSD symptoms are used in the logistic regression models in place of the PTSD diagnosis variable. The findings are consistent with those in the top part of the table in several respects. There are significant direct relationships between the number of PTSD symptoms and (1) current incarceration for homicide, rape, or assault and (2) an arrest in the last year for a violent offense. Each PTSD symptom reported increases the likelihood that individuals will be found in these categories approximately two times. The findings for a PTSD diagnosis and PTSD symptoms are also consistent for a current incarceration and an arrest history for robbery. No significant

relationship is found between PTSD symptom frequency and the same measures. PTSD symptoms do appear to increase somewhat the likelihood of adulthood fighting; no such relationship was observed for the PTSD diagnosis.

The findings for both sections of Table 9 are, on the surface at least, inconsistent with arrest history for homicide, rape, or assault. PTSD was found to be directly associated with this variable, but PTSD symptom frequency was not. This suggests that a minimum number of PTSD symptoms, at least the level required for the formal diagnosis, is required before a relationship is found between PTSD symptoms and an arrest history for homicide, rape, or assault. It should be noted, however, that the relationship of PTSD to homicide, rape, or assault arrest history was only marginally significant ($p<.10$).

The empirical evidence suggests that both PTSD and the number of PTSD symptoms are related to serious violence (robbery excepted). There is also evidence that PTSD symptom frequency is related to adulthood fighting--presumably usually a less serious form of violence than homicide, rape, and assault. The findings can be viewed with some confidence because a number of known correlates of violent behavior have been controlled.

Temporal Order of PTSD Symptoms and Violence

Examination of the temporal order of the PTSD/violence relationship may shed light on the nature of the relationship. We are hypothesizing here that PTSD may be a causal factor for violent behavior. It is also possible that violent behavior may itself precipitate PTSD or its symptoms. Laufer, Gallops, and Frey-Wouters (1984) found that participation in abusive violence among a sample of 350 Vietnam veterans was associated with subsequent psychological symptoms. Additional analyses were undertaken to examine the temporal relationship of PTSD symptoms to violence.

Adjudication and sentencing take months or, sometimes, years, making incarceration distant from the violent act. Arrest for violence, however, usually occurs within hours or days after the offense. Arrest, therefore, was chosen for the temporal analyses of the relationship of PTSD symptoms and violence. The temporal relationship of PTSD symptoms to arrest for robbery is not examined because no direct relationship was observed between these variables in the multivariate analyses reported above.

Among those who reported one or more PTSD symptoms and who had at least one arrest for homicide, rape, or assault ($n = 80$), 85 percent reported their first PTSD symptom occurred in the same year as the arrest for homicide, rape, or assault or in a preceding year. This finding is consistent with previous findings that PTSD symptoms preceded violent behavior for most individuals and, thus, supports the hypothesis that PTSD is causally important to the occurrence of the violence.

Table 10 shows how the arrests for homicide, rape, or assault are distributed relative to the timing of the first PTSD symptom. For 15 percent of individuals having at least one arrest for expressive violence and at least one PTSD symptom, the arrest occurred before the symptom. For these individuals there is no reason to think their PTSD symptom is

Table 10. Time of First Arrest for Homicide, Rape, or Assault Relative to First PTSD Symptom

Time of First Arrest		Percent of 80 Subjects			
Before PTSD symptom		15.0			
Same year as first PTSD symptom		12.5	32.5		
First year after first PTSD symptom		20.0			
Years After First PTSD Symptom	2	7.5		56.3	85.0
	3	2.5			
	4	8.8			
	5	5.0			
	6	1.3			
	7	1.3			
	8	6.3			
	9	-			
	10	1.3			
	11+	18.7			
Total		100.2			

NOTE: Percentages do not add to 100.0 due to rounding.

relevant to the arrest for violence. It is also consistent with these findings that, among the 15 percent whose violent arrests preceded their PTSD symptoms, the violence was etiologically important to the onset of the symptoms as Laufer et al. (1984) found. For the large majority, however, the first PTSD symptom occurred before the arrest for violence. For almost a third (12.5 + 20.0 percent), the first arrest for homicide, rape, or aggravated assault occurred either in the same year or in the year following the symptom onset. For more than half of the sample (56.3 percent), the first arrest for expressive violence occurred within 5 years of the first PTSD symptom.

For a large majority of cases, the timing of the symptoms and the arrests supports the hypothesis that PTSD has a causal relationship to violence.

DISCUSSION

The literature on the relationship of PTSD to subsequent violent behavior in the post-Vietnam era is scant. Only some of the systematic research has found a relationship between PTSD and violence. Moreover, insofar as we are aware, the issue has been examined only among Vietnam veterans. Many of the subjects in the current study reported traumatic stressors that were not combat-related, and only 16 percent ever served on active duty in the military.

The study reported here examined the relationship of PTSD and its symptoms to six violence measures. PTSD and its symptoms appear to be related to serious expressive violence (operationalized as an arrest or incarceration history for homicide, rape, or aggravated assault) when demographic and problem drinking factors are controlled. Typically these offenses involve expressive violence. It also appears that the PTSD symptom usually precedes the violence.

Only 26 of the inmates in the sample were diagnosed as having PTSD. This is a small number of cases on which to base inferences about a complex psychiatric disorder/violent behavior relationship and limits generalizing from the findings of the foregoing analyses. On the other hand, model results are stable, and the statistical significance of PTSD based on so few cases when several other factors were controlled is impressive.

The character of the sample also fundamentally constrains generalizing from the study findings. The 1,140 convicted male felons recently admitted to prison are not representative of an identifiable segment of the general population. On the other hand, because most previous work has focused on combat veterans, it has been enlightening to study the PTSD/violence relationship in this inmate group.

A number of implications can be drawn from the results of the current study. First, clinicians should be aware that patients with traumatic stressors, even those that are not combat-related, are potentially violent. Attention to the problems of those with traumatic stressors has tended to examine problems such as the subsequent adjustment of victims and not subsequent violent acts. The potential for subsequent violence by

individuals who have been the victims of or witnesses to violence may be high.

The child abuse literature has suggested that abused children are at increased risk of continuing the cycle by becoming violent themselves (Alfaro, 1981; Bybee, 1979; Green, 1981; Pfouts, Schopler, and Henley, 1981; Lewis et al., 1979; Kaufman and Zigler, 1987; Wenet, Clark, and Hunner, 1981). These child abuse findings seem in some sense to be consistent with the findings of this paper. The traumatic stressor effects on children who are victimized by their caretakers may resemble those associated with PTSD.

Clinical interventions that prevent violence among those with PTSD or its symptoms will prevent future victim's trauma and the offender's punishment. Violence or the threat of violence by those with PTSD may be an insidious aspect of other problems associated with PTSD. Family problems and job problems may be expected, for example, for individuals who are actually violent or who are perceived to be potentially violent. Successful clinical intervention to reduce the risk of violent acts may effectively reduce other problems as well.

Although it is important that more be learned about the potential for violence that may accrue from traumatic life events, several studies that have focused on PTSD in recent years have not considered the violence potential of the disorder itself. Both PTSD and violence are relatively rare phenomena, making research on their relationship challenging and potentially costly. Opportunities exist, however, that would not involve the heavy commitment of resources, and the issue should be considered where this relationship can be addressed with existing data. New studies of PTSD should consider including behavioral measures of violence so that the PTSD/violence relationship can be examined.

7. A REFINEMENT OF ALCOHOL DISORDER MEASURES AND A TEST OF THEIR RELATIONSHIP TO VIOLENT BEHAVIOR

Numerous studies have found a relationship between alcoholism or problem drinking and violent behavior. The prevalence of alcohol use among offenders and/or victims involved in a variety of types of violent offenses, particularly expressive violent offenses such as homicide, assault, and rape, has been striking (Wolfgang, 1958; Voss and Hepburn, 1968; Amir, 1967; Johnson, Gibson, and Linden, 1978; Rada, 1975; Mayfield, 1976; Meyer, Magedanz, Kieselhorst, and Chapman, 1978; Peterson and Braiker, 1980; Pernanen, 1979; Roslund and Larson, 1979; Centers for Disease Control, 1986; Shupe, 1954; Emerson, 1979; Gerson, 1978; McCord, 1983; Virkkunen, 1977). Studies have found substantial proportions of inmates who were alcoholics or problem drinkers, many of whom were incarcerated for violent offenses (Guze, Tuason, Gatfield, Stewart, and Picken, 1962; Guy, Platt, Zwerling, and Bullock, 1985; Collins and Schlenger, 1983; Institute for Scientific Analysis, 1978; Bureau of Justice Statistics, 1983; Roizen and Schneberk, 1977). Research on alcoholics and problem drinkers, in addition, has found a disproportionate number with criminal records and tendencies toward violent behavior (Goodwin, Crane, and Guze, 1971; Guze et al., 1962; Lindelius and Salum, 1973; Nathan, Lowenstein, Solomon, and Rossi, 1970). Finally, studies examining samples of the general population have found a relationship between alcoholism or heavy drinking and aggression and family violence (Carpenter and Armenti, 1972; Bland and Orn, 1986; Hilberman and Munson, 1977-1978; Rounsaville, 1978; Byles, 1978; Grislain, Mainard, deBerranger, deFerron, and Brelet, 1968).

The evidence supporting a problem drinking/violence relationship, however, is not fully convincing. Several studies have found either no relationship between various measures of alcohol use or abuse and violent behavior or one that is significantly weakened when other factors are controlled. Lindelius and Salum (1973), for example, found in a sample of hospital patients being treated for alcohol abuse that the relationship between alcoholism and criminal behavior varied according to the definition of alcoholism. When alcoholism was defined according to physical symptoms, there was no relationship; but when it was defined in legal terms (number of convictions for drunkenness), the relationship between alcoholism and criminal behavior was strengthened. Robins and her colleagues showed that the effects of problem drinking on violence are not strong in and of themselves, and that problem drinking may best be characterized as an intervening variable between other factors and violent behavior (Robins,

Murphy, and Breckenridge, 1968; King, Murphy, Robins, and Darvish, 1969; Robins, 1972, 1978; Robins and Wish, 1977). In Robins study of Vietnam veterans, for example, the strength of the direct relationship between heavy drinking and arrest was much reduced when juvenile deviance and drug use were controlled--then accounting for only about 2 percent of the variance. The results of the Lindelius and Salum and Robins studies suggest that the variation in the way that problem drinking has been measured and whether multiple sources of variation are controlled may account for the inconsistency in findings on the problem drinking/violence relationship.

Problem drinking is a complex, multidimensional phenomenon. Past research has used such diverse indicators as blood-alcohol content, intoxication, quantity or frequency of intake, physiological symptoms of drinking, adverse social or economic consequences of drinking, and classification by standard psychiatric nomenclature. Moreover, the often-used DSM-III psychiatric diagnosis of alcohol disorder is broad and includes arguably distinct dimensions of excessive or pathological alcohol use with alcohol-related social and economic impairment in a single category, alcohol abuse (DSM-III, 1980). In addition, this diagnostic measure has changed over time (DSM-I, 1952; DSM-II, 1968; DSM-III, 1980; DSM-III-R, 1987) and is likely to be modified further in the future as the concepts of how an alcohol disorder should be defined change.

Past research has measured the violence phenomenon in a variety of ways. Laboratory studies have measured "aggression" by observing experimental subjects administering noxious stimuli before and after the consumption of ethanol. Other work has used self-reports of violent behavior or used official records of arrest or incarceration for a violent offense. With the wide variety of ways that both problem drinking and violence have been measured in past research, it is not surprising that findings are inconsistent.

Although many studies support a problem drinking/violent behavior relationship, the inconsistencies in study results call for a more rigorous approach to understanding this relationship. This chapter uses several measures of both problem drinking and violent behavior, concentrates on the refinement of both measures, and carefully examines their relationship to determine which specific aspects of problem drinking (i.e., physiological symptoms, adverse social or economic consequences) are related to which measures of violent behavior (i.e., instrumental versus expressive violence, self-reports versus official records). The first goal of these analyses is to contribute to the understanding of the problem drinking/violent behavior relationship by identifying which aspects of problem drinking are related to which measures of violent behavior. The second goal is to create and test carefully constructed measures of problem drinking and violent behavior. These measures will allow replication of findings and more confident inferences in future work.

SUBJECTS

Subjects were 1,140 male felons recently admitted from the community to North Carolina prisons between March and June 1983. Three separate sets of data for each subject were used in the analyses reported here.

First, subjects were interviewed using the Diagnostic Interview Schedule (DIS) (Version III) developed under the sponsorship of the National Institute of Mental Health (NIMH). Questions covering demographic and criminal history information were also included in this interview schedule. Professional survey research interviewers not affiliated with the North Carolina Department of Correction conducted the interviews in private or near-private circumstances. Interviews averaged approximately 1.5 hours.

Second, data including information on previous criminal history, current incarceration offense or offenses, and sentence term taken from court commitment papers for each subject were collected from the North Carolina Department of Correction.

Third, cumulative criminal history records of officially recorded police contacts (arrests) were obtained for each subject from the North Carolina State Bureau of Investigations. Arrest records include information on date, place, and type of offense. Only arrests occurring in North Carolina were recorded.

Data for 1,149 subjects were available, but nine cases were dropped due to erroneous interviews or inconsistent data. Among the 1,327 eligible inmates, 10.2 percent refused to participate, 2.6 percent were transferred to other institutions before the interview could be completed, and 0.6 percent were not interviewed for other reasons such as physical or mental incapacitation or a language barrier. Those not interviewed tended to be older, to be nonwhite, and to have more serious criminal histories than those interviewed. Of those interviewed, 52.1 percent were age 25 or older, 45.1 percent were white, and 25.8 had at least a high school education.

APPROACH

Problem drinking measures were created by grouping drinking symptoms recorded in the DIS. In most cases, subjects who responded affirmatively to questions about each symptom were recorded as meeting the criteria for that symptom. Symptoms had to reach a defined threshold to be counted. For example, those who reported drinking as much as a fifth of liquor in one day but only once did not meet the criteria for the symptom. The sociodemographic variables of age, education, and race/ethnicity were also taken from the interview instrument.

The violent behavior measures were taken from all three sets of data (interview, arrest records, incarceration records) and represent both self-reports and official records. Two measures, current incarceration for expressive and for instrumental violent offenses, were created from the Department of Correction records. Subjects incarcerated for murder,

manslaughter, forcible rape, or serious assault were included in the expressive violence measure; those incarcerated for robbery were included in the instrumental violence measure. Almost 14 percent of subjects were currently incarcerated for acts of expressive violence and 12 percent for acts of instrumental violence or robbery.

Measures of lifetime arrests for expressive and instrumental violent offenses were created from the State Bureau of Investigation records. These records had a considerable amount of missing arrest data so, whenever possible, conviction offenses were matched to missing arrest offenses by date. Arrest data gathered in this manner may not be as accurate because arrest charges are sometimes reduced during the adjudication process. Comparisons of frequencies of arrest offenses and conviction offenses, however, show few discrepancies.

Expressive and instrumental violence arrests were grouped in the same manner as the current incarceration measures. Thirty-one percent of the sample had at least one lifetime arrest for an expressive violent offense, and 16.8 percent had at least one arrest for instrumental violence.

Measures of incidents of fighting in adulthood and recent arrests for violent offenses were based on interview self-reports. For the adulthood fighting measure, 41.3 percent of subjects reported having been in more than one fight that came to swapping blows with someone other than a wife/partner since age 18. Nearly 29 percent of subjects reported one or more arrests in the year before the interview for a violent offense such as homicide, rape, assault, or robbery.

These six violent behavior measures represent differences in the types of violence (expressive, instrumental, or undifferentiated), the seriousness and official reaction to the violence (unpunished fighting, arrests, incarcerations), the source of information (self-reports or official records), and the periods in the subjects' lifetimes (arrests only in the last year, lifetime arrests, fighting only in the adulthood years).

Factor analyses were conducted on alcohol disorder symptoms grouped into generically similar categories, categories similar to those outlined in the DSM-III. For example, symptoms indicating physical dependence on alcohol were included in one group, and symptoms indicating adverse social or economic consequences as a result of drinking were combined in another. The factor analyses were meant to (1) test whether the generically similar symptoms were also clustered statistically, and (2) identify additional underlying dimensions within each symptom group.

The factor analytic approach used eigenvalue plots to decide how many factors to keep in the model. This approach was proposed and is discussed in detail by Cattell (1966). The promax rotation method was used because of the likelihood that factors would be correlated among themselves (SAS Institute, 1979).

Multivariate logistic regression models were then tested. Independent variables were the problem drinking measures created according to the factor analysis results and three sociodemographic variables. Dependent

variables were the six violent behavior measures discussed in the previous section. Logistic regression uses maximum likelihood to estimate logged regression coefficients for the effects of the independent measures on the dependent measures. Each variable in the models is dummy coded where one category, assigned the value of one, is compared to the other, assigned the value of zero. Exponentials of the logistic regression coefficients are interpreted as odds ratios. Odds ratios less than 1.0 indicate an inverse relationship between independent and dependent measures, and ratios greater than 1.0 indicate a positive relationship. Odds ratios at or near 1.0 indicate no relationship between independent and dependent variables. The chi-square statistic was used to estimate statistical significance. The logistic regression procedure controls variation accounted for by other variables in the model when computing coefficients for each nonzero value of independent variables. The results to be reported in the next section, for example, show that those 25 or older are more likely than those younger than 25 to have an arrest history for expressive violence when variation accounted for by the other demographic variables and the problem drinking variables is controlled.

RESULTS

Creating the Alcohol Disorder Measures

Previous studies (Collins and Schlenger, 1987) and preliminary analyses for this paper attempted to use the DSM-III diagnostic measure of alcohol abuse/dependence in multivariate analyses predicting various measures of violent behavior. Collins and Schlenger combined the diagnostic criteria for excessive or pathological use of alcohol, social and economic consequences of alcohol use, and alcohol dependence into one dimension of alcohol disorder in models predicting violent behavior, but this measure was not a statistically significant predictor of any of the types of violent behavior examined. The measure includes at least three conceptually distinct dimensions of alcohol disorder which, when combined, may mask effects of any one dimension on violent behavior. Preliminary analyses in the study reported here tested violent behavior models that included the diagnostic criteria of alcohol abuse alone (pathological use and social/economic impairment) as well as alcohol dependence accompanied or not accompanied by alcohol abuse. Too few respondents met the criteria for dependence without abuse to support an examination of the effects of alcohol dependence alone on measures of violent behavior. These measures did have significant effects on some of the violent behavior measures, but the complex nature of the alcohol disorder measures made attempts at meaningful interpretation fruitless. It was clear that the alcohol measures had to be further refined and simpler dimensions distinguished before meaningful interpretation of significant effects would be possible. Ideally, refinement would include measures representing DSM-III-R diagnostic criteria. Unfortunately, many of these measures were not included in the DIS questionnaire available for this study, so factor analysis was used to distinguish conceptually distinct dimensions among the DSM-III alcohol disorder symptoms.

Twenty-eight alcohol disorder symptoms were included in the DIS questionnaire. Preliminary factor analyses revealed seven complex factors

predicting this large group of symptoms. Attempts at theoretical interpretation of these factors, however, revealed no meaningful distinctions between factors. The appropriate next step was to use an a priori theoretically based grouping of symptoms in another factor analysis procedure. The symptoms were combined into three groups similar to the diagnostic groups outlined in the DSM-III. The first group, pathological/excessive alcohol use, contains symptoms indicating the alcohol use level. The second group, social/economic impairment, includes items measuring social and occupational problems resulting from subjects' alcohol use. The third group, alcohol dependence/disease, contains symptoms measuring dependence on alcohol and any diseases related to alcohol use. Factor analytic procedures were run separately for each of the three groups of symptoms. Factor patterns or loadings are presented in Table 11. The factor loadings are comparable to ordinary least squares standardized regression coefficients representing the effects of the unmeasured factor or underlying dimension on each measured variable ($X_1 = \lambda_{11}f_1 + \delta_1$, where X_1 is the measured variable, λ_{11} the factor loading of f_1 on X_1, f_1 the unmeasured factor, and δ_1 the error in X_1).

The seven symptoms in the pathological/excessive use group all loaded on the same factor. Collectively, this factor explained 48.3 percent of the total variance of the seven variables in this group, and most of the factor loadings are quite strong. These results provide strong support for the hypothesis that these variables represent one underlying dimension of pathological/excessive alcohol use.

The symptoms in the social/economic impairment group, however, loaded on two common factors, suggesting the need for a finer distinction in grouping these symptoms. The symptoms loading most heavily on Factor 1 were: job/school troubles, lost job/got kicked out of school, neglected responsibilities, and could not do ordinary daily work without drinking. This factor explained 37.2 percent of the total variance of the eight variables in this group. The symptoms loading most heavily on Factor 2 were: family objections, friend or professional objections, trouble driving, and arrested for drinking. This second factor explained 31.6 percent of the total variance of the variables in this group.

On conceptual grounds, the first factor in the social/economic impairment grouping represents a dimension of problems meeting responsibilities because of drinking. Each of the symptoms loading most heavily on this factor measure a specific or general responsibility unmet because of alcohol use. The second factor represents a dimension of negative sanctions for drinking. The symptoms loading most heavily on this factor measure social disapproval or legal repercussions as a result of drinking.

The 13 symptoms in the alcohol dependence/disease group loaded on three common factors. Those loading most heavily on Factor 1 were: wanting to stop drinking, structured drinking, drinking upon awakening, blackouts, shakes, stomach trouble, and memory trouble. This factor explained 15.2 percent of the total variance of the 13 variables in this group. The symptoms loading most heavily on Factor 2 were: fits or seizures, delerium tremens, hallucinations, and tingling or numbness. This second factor

Table 11. Factor Patterns

Symptoms	Factor Patterns		
Pathological/Excessive Use Grouping	Factor 1		
Drunk more than once before age 15	Ø.54		
Thought self an excessive drinker	Ø.7Ø		
Drank as much as a fifth of liquor in one day	Ø.76		
Drank 7 or more drinks every day for a period of 2 weeks	Ø.82		
Drank 7 drinks at least once a week for a couple months	Ø.76		
Ever gone on binges or benders	Ø.75		
Continued to drink in spite of serious physical illness	Ø.44		
Percent of Variance Explained by Factor	48.28%		
Social/Economic Impairment Grouping	Factor 1	Factor 2	
Family objected to amount of drinking	Ø.24	Ø.51[2]	
Friends or professionals objected to amount of drinking	Ø.35	Ø.8Ø[2]	
Job or school troubles because of drinking	Ø.83[1]	Ø.Ø2	
Lost job/got kicked out of school because of drinking	Ø.81[1]	-Ø.1Ø	
Gotten into trouble driving (accident, arrested) because of drinking	-Ø.14	Ø.85[2]	
Arrested or held by police because of drinking	-Ø.Ø1	Ø.81[2]	
Neglected responsibilities while on binges or benders	Ø.68[1]	Ø.13	
Period when could not do ordinary daily work without drinking	Ø.68[1]	Ø.ØØ	
Percent of Variance Explained by Each Rotated Factor Ignoring Other Factors	37.25%	31.62%	
Alcohol Dependence/Disease Grouping	Factor 1	Factor 2	Factor 3
Wanted to stop drinking but couldn't	Ø.68[1]	Ø.16	-Ø.Ø6
Structured drinking in order to control the amount	Ø.62[1]	-Ø.11	-Ø.Ø6
Needed a drink after getting up	Ø.62[1]	Ø.1Ø	Ø.15
Blackouts while drinking	Ø.72[1]	-Ø.Ø8	Ø.11
"Shakes" after stopping or cutting down	Ø.57[1]	Ø.2Ø	Ø.17
Fits or seizures after stopping or cutting down	-Ø.1Ø	Ø.78[2]	-Ø.11
Delerium Tremens (DTs)	Ø.Ø2	Ø.78[2]	Ø.13
Visual or auditory hallucinations after stopping or cutting down	-Ø.Ø3	Ø.81[2]	-Ø.Ø1
Liver disease or yellow jaundice from drinking	-Ø.Ø3	Ø.Ø6	Ø.77[3]
Stomach trouble from drinking	Ø.54[1]	Ø.Ø5	-Ø.15
Tingling or numbness in feet because of drinking	Ø.Ø2	Ø.4Ø[2]	-Ø.18
Memory trouble when not drinking	Ø.49[1]	-Ø.19	-Ø.18
Inflammation of pancreas or pancreatitis because of drinking	-Ø.Ø9	-Ø.22	Ø.79[3]
Percent of Variance Explained by Each Rotated Factor Ignoring Other Factors	15.23%	13.23%	9.46%

Note: Postscript numbers next to factor loadings indicate the factor on which each variable loaded most heavily.

explained 13 percent of the total variance of the variables. Only two variables loaded heavily on Factor 3. These were liver disease/yellow jaundice and inflammation of the pancreas/pancreatitis. Nearly 10 percent of the total variance of the variables was explained by this third factor.

The symptoms loading most heavily on Factor 1 of the alcohol dependence/disease grouping are relatively less serious than those loading in Factors 2 and 3. Factor 1 symptoms are a mixture of behavioral, psychological, and physical symptoms of alcohol dependence. The purely physical symptoms of dependence that load most heavily on Factor 2, on the other hand, represent more serious physical problems and probably a more advanced stage of dependence. Seizures, DTs, and hallucinations, for example, are more serious symptoms of dependence than are blackouts, shakes, and stomach trouble, the symptoms loading most heavily on Factor 1.

The variables loading most heavily on Factors 1 and 2 are symptoms. The two variables loading most heavily on Factor 3, however, are alcohol-related disorders, usually the result of long-term, heavy alcohol use. This third factor represents a serious level of problem drinking that has probably been maintained at a high level for a long period of time.

The factor analysis results give direction for the refinement of problem drinking measures. The factor loadings in the social impairment and alcohol dependence/disease groups were clear and distinct. A variable loading heavily on one factor did not load heavily on another factor. Because there was little overlap across factors for each variable, new problem drinking measures were created using only the heaviest loading variables on each factor.

The new measures were created as counts of the symptoms loading most heavily on each factor. The symptom variables were first recoded so that subjects meeting the criteria for a particular symptom were given a code of one (1) for that variable, and those not meeting the criteria were given a code of zero. The variables loading most heavily on each factor were then added together. The values of the resulting measures ranged from zero (subjects with none of the symptoms in each group) to the maximum number of symptom variables included in each measure. For example, the measure created from Factor 1 in the social/economic impairment symptom group included the following symptoms: job/school troubles, lost job/kicked out of school, neglected responsibilities, and could not do ordinary daily work. The values for this new measure, called "Trouble Meeting Responsibilities," range from zero to four (the number of symptoms loading most heavily on Factor 1).

The other problem drinking measures were similarly named for the common dimension of the most heavily loading variables. Factor 1, including all the symptoms in the first group, is called "Pathological/Excessive Use." Factor 2 in the social/economic impairment group is named "Negative Sanctions for Drinking." Factor 1 in the last group is called "Less Serious Symptoms of Dependence," Factor 2 "More Serious Symptoms of Dependence," and Factor 3 "Alcohol-Related Physical Disorders."

The largest percentage of subjects had none of these six new problem drinking measures. Much smaller percentages had more than two or three symptoms. The measures were dichotomized (no symptoms, one or more symptoms) to adjust for the skewed distributions of these variables. Table 12 gives the percentages of subjects with one or more symptoms in each measure.

A large percentage of subjects met the criteria for at least one type of problem drinking symptom. The majority had one or more symptoms of Pathological/Excessive Use and Negative Sanctions for Drinking, and considerable percentages met the criteria for one or more symptoms of Less Serious Symptoms of Dependence and Trouble Meeting Responsibilities. Relatively few subjects had More Serious Symptoms of Dependence and Alcohol-Related Physical Disorders. Regardless of the uneven distributions, these last two measures were included in the subsequent multivariate analyses and, in some cases, had significant effects on the violent behavior measures.

The new dichotomized problem drinking measures were used as independent variables in logistic regression models estimating the likelihood of six indicators of violent behavior. Moderate correlations between the problem drinking measures ($r = .20$ to $.75$) support the assumed uniqueness of factors and the appropriateness of including all six measures in the same model.

Multivariate Results

Table 13 shows the results of the logistic regression models estimating the effects of problem drinking on six different indicators of violence. Included in each model were nine independent variables: age, race, education, and the six indicators of problem drinking. Cell entries in the table are odds ratios, defined as the exponentials of logistic regression coefficients.

The first row of Table 13 indicates that age has a statistically significant effect on only one of the dependent variables--having an arrest record for an expressive violent offense. Inmates 25 or older at admission are 1.4 times more likely than younger inmates to have been arrested for such an offense. This is not surprising given that older individuals will have had a longer period of exposure to the possibility of such arrests.

According to odds ratios for race, whites are less likely than nonwhites (mostly blacks) to be arrested or incarcerated for violent offenses. This holds for both expressive and instrumental violence. Whites do not differ significantly from nonwhites in their reports of multiple episodes of fighting in adulthood. These findings are consistent with patterns seen in other data where blacks are disproportionately arrested and incarcerated for violent offenses (Blumstein, Cohen, Roth, and Visher, 1986; Bureau of Justice Statistics, 1986; Federal Bureau of Investigation, 1988; Wolfgang, Figlio, and Sellin, 1972).

Education is significantly associated with an arrest record for expressive violence. Those with at least a high school education are less likely than those with less education to have such a record.

Table 12. Percentages of Subjects with One or More Symptoms in Each Problem Drinking Measure

Problem Drinking Measures	Subjects with One or More Symptoms (N=1140)
Pathological/Excessive Use	59.0%
Trouble Meeting Responsibilities	21.8
Negative Sanctions for Drinking	54.7
Less Serious Symptoms of Dependence	34.6
More Serious Symptoms of Dependence	5.7
Alcohol-Related Physical Disorders	2.0

Table 13. Odds Ratios of Alcohol Disorder Measures on Measures of Violent Behavior

Predictor Variables	Arrested for Violent Offense in Last Year	Ever Arrested for Expressive Violence	Ever Arrested for Instrumental Violence	Current Incarceration for Expressive Violent Offense	Current Incarceration for Instrumental Violent Offense	Multiple Adulthood Fighting
Age 25 or older	0.89	1.40*	0.76§	1.36§	0.76	1.04
White	0.46***	0.57***	0.35***	0.68*	0.33***	1.23
High School or More	0.85	0.69*	0.82	0.84	1.30	0.94
Less Serious Symptoms of Dependence	1.00	0.93	0.84	0.79	1.36	1.17
Trouble Meeting Responsibilities	1.34	1.48§	1.51	0.79	0.94	1.57*
Alcohol-Related Physical Disorders	2.12	1.42	2.51§	4.22**	0.79	0.60
Negative Sanctions	1.48*	1.51*	0.95	2.12**	0.91	1.49*
Pathological/Excessive Use	0.98	0.68*	1.65*	0.67§	1.06	1.95***
More Serious Symptoms of Dependence	2.36**	1.39	0.37*	1.82	1.21	0.62§
n =	(1120)	(1125)	(1125)	(1125)	(1125)	(1120)

§ p<.10
* p<.05
** p<.01
*** p<.001

There were several findings from the logistic regression for the relationship between various aspects of problem drinking and the violence measures. First, there is no evidence of a relationship between less serious symptoms of alcohol dependence and violence. There is weak evidence of a relationship between problem drinking as measured by having trouble meeting responsibilities and violence. Those who report one or more of these symptoms are 1.6 times more likely than those who do not report such symptoms to say they have been involved in two or more fights in adulthood. These individuals also appear more likely to have an arrest record for expressive violence.

Having an alcohol-related physical disorder, which suggests a pattern of heavy drinking over a long time period, is significantly associated with a current incarceration for an expressive violent offense and (below .10) an arrest history for instrumental violence. Based on the magnitude of the odds ratios, these associations are robust. Individuals with an alcohol-related physical disorder are 4.2 times more likely than those without such a disorder to have been currently incarcerated for an expressive violent offense.

Those reporting negative sanctions for their drinking are significantly more likely than those who do not report negative symptoms to: (1) have been currently incarcerated for an expressive violent offense, (2) have a recent arrest for a violent offense, (3) have an official arrest record for expressive violence, and (4) have had multiple adult fights. These findings are the most consistent of any of the problem drinking independent variables and suggest a positive relationship to violence.

The findings for pathological or excessive alcohol use and for more serious symptoms of alcohol dependence are statistically significant in several instances, but the relationships are not consistent. Pathological/excessive use is positively associated with an arrest history for instrumental violence and adult fighting but inversely associated with arrest and incarceration for expressive violence. More serious symptoms of alcohol dependence are positively associated with recent arrest for a violent offense but inversely associated with an arrest history for instrumental violence (robbery) and adulthood fighting.

Table 13 findings indicate:

- evidence for a direct relationship between problem drinking and recent arrest for a violent offense,
- inconsistent (i.e. both positive and inverse) evidence for a relationship between problem drinking and an arrest history for expressive violence,
- inconsistent (i.e. both positive and inverse) evidence for a relationship between problem drinking and an arrest history for robbery,
- inconsistent (i.e. both positive and inverse) evidence for a relationship between problem drinking and current incarceration for an expressive violent offense,
- no evidence of a relationship between problem drinking and incarceration for robbery,

- evidence of a positive relationship between problem drinking and fighting in adulthood with the suggestion that an inverse relationship may pertain for individuals with more serious symptoms of alcohol dependence.

These inconsistent effects of the alcohol disorder measures across the six violent behavior measures support the notion that the violent behavior measures have conceptually distinct dimensions. In fact, no pair of violent behavior measures is more than moderately correlated. Such results further suggest the need for the careful measurement of and distinction between different types of violent behavior. The statistical significance, magnitude, and direction of the relationship between various aspects of problem drinking and violent behavior depend on the particular dimensions of the disorder and behavior being measured.

DISCUSSION

Exploratory factor analyses examining the factor loadings of alcohol disorder symptom measures suggest the need for making distinctions within DSM-III symptom groupings. Analyses were conducted within each of the three groups of symptoms outlined in the DSM-III (excessive use, social/economic impairment, dependence), but six instead of three distinct symptom groups were discovered. The factor analysis did support the appropriateness of grouping the pathological/ excessive use symptoms. All of the seven symptoms included in this group loaded moderately to heavily on a single factor.

The eight symptoms in the social/economic impairment group, however, loaded on two, not one factor. The dimensions represented by these factors are negative sanctions from others for drinking (symptoms included objections from family, friends, or professionals and alcohol-related arrests) and difficulties meeting responsibilities (lost job or kicked out of school, job or school troubles).

The alcohol dependence/disease group was perhaps the most complex of the three groups in that it contains symptoms of behavioral, psychological and physical dependence as well as symptoms representing different levels of seriousness of dependence. Symptoms in this group loaded on three distinct factors that represent three different levels of the seriousness of alcohol dependence. The least serious dimension includes symptoms such as wanting to stop drinking, needing a drink after getting up, blackouts, and shakes. More serious symptoms include fits or seizures, DTs, and hallucinations. The most serious level of dependence includes the alcohol-related physical disorders including liver disease and pancreatitis.

These results imply that distinguishing various dimensions of the DSM-III alcohol disorder is appropriate and that a statistical procedure such as exploratory factor analysis would be useful to determine the simplest measures from this large and complex group of symptoms.

The multivariate logistic regression findings reported here mirror those of previous work in several respects:

- the data show evidence of a positive relationship between problem drinking and violence;
- the strength of the problem drinking/violence relationship is not generally strong when variation accounted for by other factors is controlled;
- some analyses show no evidence of a relationship between problem drinking and violence.

One pattern observed in the analyses has not been reported previously--an inverse relationship between problem drinking and violence. Pathological/excessive use was inversely associated with an arrest history for expressive violence; more serious symptoms of dependence were inversely associated with adulthood fighting ($p<.10$), and an arrest history for robbery.

The analyses allow several unambiguous inferences. First, assuming that adulthood fighting is usually expressive violence, the evidence of a direct relationship between problem drinking and violence is stronger for expressive than for instrumental violence. Odds ratios indicated only two significant direct relationships for instrumental violence: alcohol-related physical disorders with an arrest history for robbery ($p<.10$) and pathological/excessive use with an arrest history for robbery. On the other hand, odds ratios indicate five direct relationships between problem drinking and expressive violence. This finding is consistent with the notion that alcohol's capacity to induce violence is manifested in "expressive" (emotional, irrational, impetuous) violent acts.

A second clear finding is that less serious symptoms of alcohol dependence do not increase the odds of violence. Individuals who show less serious symptoms of dependence, however, are probably at increased risk of developing more serious symptoms, which are directly associated with an elevated risk of recent arrest for violence.

A third clear finding is that negative sanctions for drinking (from family or police) are strongly correlated with involvement in violence. This finding is difficult to interpret further because sanctions are an indirect measure of problem drinking. Sanctions differ from pathological/excessive use and dependence (which directly tap alcohol intake and its physiological effects), however, because they are assessments by others that drinking is a problem for an individual. Those sanctioned may exhibit the most obvious or serious behavioral problems as a result of drinking or their violent behavior after drinking may be likely to elicit sanctions from others. Whatever the mechanism or process, the empirical evidence indicates that negative sanctions for one's drinking are robustly associated with involvement in violence.

An interpretation of the direct relationships between alcohol-related physical disorders and (1) current incarceration for an expressive violent offense, and (2) an arrest history for robbery is not apparent. Incarceration for violence implies a serious act

because less serious violent acts are often not prosecuted and those convicted often are not incarcerated. Those who have developed liver disease or pancreatitis, therefore, probably not only have long-term alcohol pathology but are also seriously violent.

The findings for pathological/excessive use and more serious symptoms of dependence are especially difficult to interpret because they indicate both significant positive and inverse effects. The current analyses do not suggest an interpretation.

Some important limitations should be kept in mind when assessing the findings reported in this chapter First, the research subjects are a sample of recently incarcerated convicted male felons in a southeastern state. Thus, they are not representative of the U.S. male population, nor even of incarcerated male felons, although their demographic profile is close to that of males incarcerated in state and federal prisons in the United States (Bureau of Justice Statistics, 1987). Although the generalizability from the sample is limited, the findings are noteworthy because male inmates are disproportionately responsible for violent behavior.

Second, the findings are inconsistent, and problem drinking and violence are indirectly measured. The subjects reported their own alcohol use and problems associated with that use; two of the dependent variables (fighting and recent arrest for violence) are based on self reports. It is thought that the self report data are generally of high quality, but recall problems, distortion, and denial on the part of the subjects make them subject to error.

Third, two of the dependent variables (arrest histories for expressive and instrumental violence) were taken from official arrest records. Arrest records are often incomplete and, on the average, they probably captured only a portion of the violent behavior engaged in by the individuals in the sample.

Given the focus of this research, the use of violence arrest histories as an indicator of violent behavior is potentially troublesome. There is some limited evidence from past work that drinking offenders are more likely to be caught than offenders who have not been drinking (Petersilia, Greenwood, and Lavin, 1978). If this is the case, using arrest as the measure of violence may overstate the relevance of problem drinking or alcohol use to violence. The results reported here do not rely exclusively on arrest and incarceration measures. The adult fighting variable is a more direct measure of violent behavior and, notably, is the dependent variable showing the highest number of statistically significant relationships to the problem drinking measure. Nonetheless, because the arrest process may capture a "biased sample" of violent offenders, the importance of alcohol use may be exaggerated.

Fourth, the findings require cautious interpretation because a theoretical basis for the problem drinking/violence relationship has not been developed. A variety of causal mechanisms have been pro-

posed. It has been suggested, for example, that alcohol use results in an elevated likelihood of misinterpreting interpersonal cues and, hence, responding violently (Pernanen, 1976, 1981). Other interpretations suggest that alcohol's effects are exerted through cultural norms. Behavioral rules may be loosened after drinking, permitting actions, including aggression and violence, that are proscribed when sober; or drinking may be used to deflect responsibility for violent behavior. Other explanatory schemes focus on situational factors such as contexts that encourage or permit violence after drinking. Because causal mechanisms are so poorly understood, it is possible that the observed empirical association between problem drinking and violence is spurious and that problem drinking does not cause violence.

Based on the analyses reported here, the most appropriate general inference about the problem drinking/violence relationship is that some symptoms of problem drinking increase the likelihood of violence, some symptoms are not associated with violence, and other symptoms may even decrease the likelihood of violence. Future research should use these problem drinking measures with other study samples and alternative indicators of violence to gain a better understanding of the stability and nature of the relationship. Use of problem drinking measures that are conceptually coherent and empirically consistent will improve the chances for progress in understanding what manifestations of problem drinking elevate the likelihood of violence.

8. MENTAL DISORDER AND INMATES' BEHAVIOR

A variety of factor determine an inmate's behavior inside a penal institution. The analysis of prison discipline has traditionally focused only on the prisoners' personal attributes. Much of the discussion in recent years has focused on aggregate analyses of the impact of institutional characteristics, such as crowding (Gaes, 1985; Pelissier, 1987) and the overall transiency of the institution's population (Gaes and McGuire, 1985).

Researchers are now fairly certain about the impact of some individual attributes on a prisoner's response to prison discipline. Most research indicates, for example, that younger prisoners are the most troublesome and have the highest rates of infraction (e.g., Bonta and Nanckivell, 1980; Brown and Spevacek, 1971; Flanagan, 1983). Unfortunately, the range of individual characteristics about which such information is available is quite limited and extraordinarily little information is available on which types of troublesome behaviors are related to which types of prisoner characteristics. Most analyses investigate the impact of a prisoner's characteristics on his or her overall infraction record or infraction rate. Most studies fail to differentiate between the extremely diverse types of behaviors that constitute infractions of prison discipline.

This research attempts to expand the available information on the range of inmate characteristics that may affect prisoner discipline by analyzing the effects of various mental disorders on prisoners' rule infractions. It differs somewhat from earlier research in that it analyzes the impact of prisoners' characteristics on their propensity to present different types of discipline problems.

The policy relevance and practical importance of this issue is obvious. Problems of institutional order can be reduced if those inmates who present different types of challenges to prison discipline can be identified before they enter the institutional population. The ability to identify them depends on understanding the relationship between institutional behavior and a wide range of identifiable individual characteristics. This research provides some insight into the potential usefulness of mental status information in identifying inmates who will present different types of behavior problems.

PAST RESEARCH

The research issue in this analysis derives, in part, from a long but troubled line of more academic research on criminality. Researchers have, for many years, been concerned with what impact mental disorders have on the propensity to engage in crime. There is a reasonable amount of prevalence data on mental health disorders among prisoners although the exact nature of the relationship between mental disorders and criminal activity is far from clear (see Monahan and Steadman, 1983 and Chapters 1 and 3 of this report).

Mental disorders among prisoners are not rare. Guze and his colleagues (1962) found that just over one-half of male felons exhibited some psychiatric disorder. More recent information provides one with a similar picture. Ten percent of an Oklahoma prison population were diagnosed as severely disturbed, while 35 percent were diagnosed as needing significant assistance with their mental health problems (James, Gregory, and Jones, 1980). Two-thirds of almost 500 admissions to Philadelphia facilities were diagnosed as disturbed. (Guy et al., 1985).

Information on the impact of mental status on prison infractions, however, is limited. One study found that former mental patients exhibited higher infraction rates than did other prisoners (Adams, 1983). Myers and Levy (1978) speculated that higher levels of depression may be associated with higher rates of infraction, and Flanagan (1983) suggested that a history of substance abuse may be a determinant of an inmate's response to prison discipline.

Available knowledge of what types of mental health problems are correlated with which types of disciplinary problems is even more sparse. Inmates have usually simply been categorized as individuals with high or low infraction rates. Unfortunately, these infraction rates and records are not usually disaggregated into complexes of activities that represent different types of threats to institutional order.

APPROACH

This chapter analyzes the impact of antisocial personality disorder, anxiety disorder, affective disorder, alcohol abuse disorder, and drug abuse disorder on prison rule infractions. The analysis investigates the effects of these five specific mental disorders on four different types of infractions -- infractions involving serious violence, infractions of moderate seriousness, infractions involving some type of substance abuse, and all other infractions.

The analysis will, first, investigate the prevalence of each of these types of infractions among the population with each mental health disorder. It will also include an inquiry into the impact of these disorders on the rate of infractions for those inmates who commit each type of infraction.

The Data Base

Data were gathered on 1,140 male felons recently admitted from the community to North Carolina prisons between March and June of 1983. These data came from two basic sources -- a personal interview with the inmate soon after his admission to the system and official records concerning that inmate. These records were made available by North Carolina criminal justice agencies.

The inmates were interviewed using the Diagnostic Interview Schedule (DIS -- III) developed under the sponsorship of the National Institute of Mental Health. The interviews, which averaged approximately 1.5 hours, were conducted by professional survey research interviewers in private or near-private circumstances. The information gathered in the interviews was supplemented by data on the inmates' criminal careers. These data were supplied by the North Carolina State Department of Correction and the North Carolina State Bureau of Investigation. Finally, the inmates' records of prison rule infraction were supplied by the Department of Correction and covered the period from their admission in 1983 to October 1, 1984.

As Table 14 indicates, the average inmate in the study was under 28 years of age. He had a record of a total of six arrests, and his projected release date was to occur after approximately two years and ten months of institutionalization. Fifty-five percent of the inmates were non-white, and 29 percent were incarcerated in this instance for conviction of a violent crime (i.e., homicide, assault, robbery, rape).

Mental Status Disorders

This research focuses on the effect of five mental disorders (APA, 1980). Antisocial personality is defined as a pattern of chronic and continuous antisocial and exploitative activity. The alcohol and drug abuse disorders are defined by a pattern of pathological use that impairs social or occupational functioning. Affective disorder applies to those who experience mood disturbances that are accompanied by some manic or depressive syndrome. Anxiety disorder diagnoses apply to those who have panic, phobic, or obsessive compulsive disorders. These disorders and their prevalences are discussed in greater detail in earlier chapters of this report.

Table 15 shows the prevalences of these disorders among those in the study population. Both lifetime prevalence and prevalence in the six months before the interview are shown. The analysis presented below examines the possibility that prisoners with recent and lifetime diagnoses may behave somewhat differently while incarcerated.

As one can see in Table 15, the two most common lifetime disorders are alcohol abuse (49 percent) and antisocial personality (28 percent). Anxiety disorders (lifetime) were diagnosed in 17 percent of the prisoners, and a drug abuse problem affected 15 percent. Affective disorders (lifetime) were the least prevalent, appearing in 7 percent of the prisoners.

Table 14. Descriptive Statistics

Variable	Mean	Standard Deviation
Age (years)	27.6	8.60
Race (white=1)	.45	--
Sentence (years)	2.84	3.13
Current offense (violent=1)	.29	--
Total previous arrests	6.03	5.48
Total violent arrests	.78	1.19

Note. The original data set included 1,144 inmates. However, the data records for 24 of these inmates included errors in at least one of the variables included in this research. These cases were dropped from the data base. For the logistics regressions, close to 150 other cases (it varied by the model) were dropped from a specific analysis because of missing values for at least one of the variables included in our models. Thus, these models were estimated on approximately 1,000 inmates. The OLS models were run on different numbers of inmates, depending on how many had engaged in the type of infraction under consideration. For example, the OLS model for serious infraction rates involved only those 116 inmates who were charged with at least one serious violation.

Table 15. Proportions of Inmates with Each Mental Health Disorder

Disorder Type	Lifetime	Recent (Last 6 Months)
	%	%
Antisocial personality	.28	.19
Alcohol abuse/Dependence	.49	.27
Drug abuse/Dependence	.15	.10
Affective	.07	.02
Anxiety	.17	.06

Note. Prevalence estimates may differ slightly from those used in other chapters due to missing data.

As one would expect, the recent prevalences are somewhat lower than the lifetime figures. Recent affective disorders were diagnosed in only 2 percent of the prisoners, and recent anxiety disorder appeared in only 7 percent of the prisoners. Ten percent of the prisoners qualified for a diagnosis of recent drug abuse, while 27 percent qualified for a diagnosis of recent alcohol abuse.

Infractions

The 41 different infractions included in the data provided by the North Carolina Department of Correction ranged from the mundane (e.g., personal untidiness, failure to keep quarters clean, possession of unauthorized funds) to the serious (e.g., fighting in which an injury occurs, sexual assault). Inmates' participation in four types of infractions -- infractions involving serious violence, moderately serious infractions, substance-related infractions, and nonserious infractions -- were analyzed separately.

Assault, sexual assault, fighting in which an injury occurs, and hostage-taking were considered serious infractions. Those 129 inmates (11 percent) who were charged with serious infractions averaged almost two serious offenses (1.81) per year. The moderately serious infractions included possession of a weapon, threatening another inmate, an attempt to commit a major violation, and any statutory violation while incarcerated. Ninety inmates (8 percent) committed 126 of these offenses (average = 1.40). Substance-related infractions included the use of unauthorized drugs or alcohol, the misuse of authorized drugs, and the inhalation of substances for the purposes of intoxication. Fourteen percent of the inmates included in this study were charged with one of these three substance-related infractions. Minor infractions were committed by 29 percent (324) of the inmates. These inmates averaged 3.14 minor infractions per year.

Analytic Model

Four of the eight dependent variables used in the analyses are dichotomies that represent the simple absence or presence of a specific type of infraction. The other four dependent variables are continuous, representing the annual rate of each type of infraction for those with a record of that specific type of infraction. The distributions for our four continuous dependent variables were positively skewed. These variables were logged to normalize their distributions.

The independent variable of greatest interest, mental disorder diagnoses, is represented by five separate disorder categories. These five variables are binary indicators representing the presence of each of the disorders included in our analysis -- antisocial personality, drug abuse, alcohol abuse, affective, and anxiety disorders. Each inmate is classified on both the lifetime and recent presence of the five disorders. These binary variables allow investigation of the unique effect of each disorder on an inmate's infraction record.

The impact of demographic variables and criminal history was investigated in two different forms of multivariate models. Previous research has shown that these variables may affect an inmate's infraction record (Flanagan, 1983; Bonta and Nanckivell, 1980; Myers and Levy, 1978; Brown and Spevacek, 1971). Younger offenders, for example, are more likely to break institutional rules as are those with long sentences. Because an offender's sentence is, in some measure, an indication of his dangerousness, such a relationship seems very reasonable. One might also reasonably suspect that the length and nature of an offender's prior record affect his infraction record. The inmate's race is also included in the model.

The analysis of the logged rates of various types of infractions was carried out using ordinary least squares (OLS) regression. The analysis of the binary dependent variables was carried out using logistic regression. For the logistic regressions, the continuous independent variables were dichotomized at their means.

Two models will be evaluated for each dependent variable (infractions). Both models include the criminal history and demographic data for each inmate. One of these models includes those dichotomous variables representing lifetime diagnoses of our mental disorders. The other model contains those binary variables representing recent (i.e., last six months) diagnoses of our five disorders.

For those models including the recent diagnosis variables, only the parameters for the mental health problems are reported in the tables below. This is done purely for presentational economy. It is the parameters associated with these mental health problems that are the focus of analysis, and the coefficients for the criminal record and demographic data rarely varied significantly across the two sets of models.

RESULTS

The results for the analyses of the impact of lifetime disorder diagnoses on an inmate's involvement in serious violations appear in Table 16. Neither the model of an inmate's participation in serious infractions (Column 1) nor the model for his serious infraction rate (Column 2) is very powerful. The findings concerning the various independent variables are, however, still of some interest.

Though the ten variables explain only 3 percent of the log likelihood of engaging in serious infractions, two of an inmate's demographic characteristics and two aspects of his criminal record are significantly ($p < .05$) related to whether he is charged with a serious infraction. Older inmates (i.e., over 28) and white inmates are roughly one-half as likely as their counterparts to have a serious infraction. However, inmates with more than an average number of arrests (i.e., over 6) and inmates with a longer than average sentence (i.e., over 2.8 years) are more likely to have serious infractions. In fact, those inmates with a longer-than-average sentence are twice as likely to have some serious infraction during their first year of incarceration.

Table 16. Multivariate Models for Serious Infractions

Variable	Odds Ratio (participation)	Standardized Coefficient (infraction rate)
Age (years)	0.41**	-0.42**
Race	0.61*	-0.01
Total arrests	1.54*	-0.03
Violent arrests	1.31	0.20
Current offense	0.95	-0.20
Sentence length	2.10**	-0.02
Mental Health Problems (Lifetime)		
ASP	1.20	-0.11
Alcohol	1.21	0.16
Drugs	1.18	-0.03
Affective	0.43	0.08
Anxiety	0.84	0.14
Pseudo-R =	0.18	Adjusted R-Square = 0.11
squared	0.03	
Mental Health Problems (Recent)		
ASP	1.28	-0.01
Alcohol	0.89	0.13
Drugs	1.10	0.01
Affective	0.78	0.15
Anxiety	1.31	0.14
Pseudo-R =	0.18	Adjusted R-Square = 0.12
squared	0.03	

* $p<.05$
** $p<.01$

None of the mental health diagnoses, either lifetime or recent, has a significant impact on an inmate's probability of being charged with a serious infraction when demographic and criminal history factors are controlled.

Column 2 of Table 16 indicates what factors predict the annual rate at which inmates who were charged with a serious infraction commit that infraction. As much of the previous research shows, younger inmates represent the greatest risk to institutional discipline and safety. Again, none of the mental health problems included in the model has a significant effect.

As Table 17 indicates, age is a major factor in the analysis results for moderately serious infractions. Younger inmates are more than twice as likely to engage in moderately serious infractions. Offenders with longer sentences are twice as likely to have moderately severe infractions as are inmates with a lifetime diagnosis of antisocial personality.

The determinants of one's rate of moderately serious infractions, however, are not the same variables that determine one's participation in such offenses. Three mental health disorders are significantly related to the infraction intensity. Inmates who have alcohol dependency, drug dependency, or some type of affective disorder (e.g., depression or manic/depressive disorders) have higher rates of moderately serious infractions than other inmates who engage in this type of behavior. Interestingly, it is a lifetime, rather than recent, diagnosis of alcohol dependence that is important, but it is a recent, rather than lifetime, diagnosis of drug abuse/dependence that has the larger impact.

Unlike the results presented earlier for serious offenses, an inmate's age and sentence length do not seem to affect significantly his participation in moderately serious offenses. Instead, only those inmates who are incarcerated for a nonserious offense seem likely to engage in moderately serious infractions at a higher rate than other groups of inmates distinguished by any of our demographic or criminal record data.

The results for the analysis of the determinants of substance-related infractions appear in Table 18. No variable in the models is useful for predicting the rates at which inmates engage in substance-related offenses, but two variables are associated with whether an inmate participates in such activities. Younger inmates and those inmates with an alcohol abuse or alcohol dependency problem are more likely to engage in substance-related infractions while incarcerated.

The models, however, explain only 1 percent of the log-likelihood of engaging in such infractions and only 4 percent of the variation in the rates of infraction for those inmates who do engage in this type of behavior.

Only one of the psychiatric disorders seems to have an effect on whether an inmate has a record of minor infractions (Table 19). Those inmates with either a lifetime or a recent diagnoses of antisocial personality are between one and one-half times and twice as likely to have

Table 17. Multivariate Models for Moderately Serious Infractions

Variable	Odds Ratio (participation)	Standardized Coefficient (infraction rate)
Age (years)	0.41**	-0.16
Race	0.83	-0.11
Total arrests	1.50	-0.11
Violent arrests	1.52	0.04
Current offense	0.89	-0.38**
Sentence length	2.07**	-0.02
Mental Health Problems (Lifetime)		
ASP	1.99**	-0.08
Alcohol	1.00	0.24*
Drugs	1.33	0.22
Affective	0.66	0.31**
Anxiety	1.13	0.03
Pseudo-R Squared =	0.18 0.03	Adjusted R-Square 0.22
Mental Health Problems (Recent)		
ASP	1.51	0.02
Alcohol	1.31	0.14
Drugs	1.20	0.30**
Affective	0.45	0.25*
Anxiety	1.40	0.15
Pseudo-R Squared =	0.16 0.02	Adjusted R-Square 0.13

* $p < .05$
** $p < .01$

Table 18. Multivariate Models for Substance Related Infractions

Variable	Odds Ratio (participation)	Standardized Coefficient (infraction rate)
Age (years)	0.66*	0.02
Race	1.16	0.00
Total arrests	1.20	0.16
Violent arrests	0.79	-0.08
Current offense	1.01	-0.03
Sentence length	1.19	-0.08
Mental Health Problems (Lifetime)		
ASP	1.32	-0.08
Alcohol	1.95**	0.05
Drugs	1.13	0.07
Affective	0.66	-0.16
Anxiety	1.01	0.16
Pseudo-R =	0.10	Adjusted R-square = 0.06
squared	0.01	
Mental Health Problems (Recent)		
ASP	1.47	-0.10
Alcohol	2.04**	0.15
Drugs	1.02	-0.10
Affective	0.85	-0.04
Anxiety	1.03	0.07
Pseudo-R =	0.12	Adjusted R-square = 0.04
squared	0.01	

* $p<.05$
** $p<.01$

minor infractions as are inmates without these diagnoses. Younger and black inmates and inmates serving longer sentences are also more likely to engage in minor breaches of discipline.

As Table 19 indicates, anxiety is the only mental disorder to significantly affect an inmate's rate of minor infractions. The diagnosis of an anxiety disorder does not make an inmate more likely than others to commit minor infractions; but of those inmates who do commit minor infractions, those with anxiety disorders have a significantly higher infraction rate than those without a diagnosed anxiety disorder. Again, younger offenders participate in these types of offense more intensely.

SUMMARY

The purpose of this analysis is to study the impact of specific inmate mental disorders on different types of infractions. Specifically, the inquiry focused on the impact of lifetime and recent diagnoses of antisocial personality, alcohol abuse, drug abuse, affective disorders, and anxiety disorders on the serious, moderately serious, substance-related, and minor rule infractions of male prison inmates in North Carolina.

The analyses modeled both an inmate's participation in each of the four types of infractions and the intensity of the infraction rate for all those inmates who engaged in each type of infraction. The models used in this effort included variables that represented the sociodemographic characteristics and the criminal careers of our inmates. A summary of the results of the analyses appear in Table 20

Sociodemographics and Criminal Career

As Table 20 indicates, it is these sociodemographic and criminal career variables that provide the greatest insight into an inmate's infraction record. Two factors, an inmate's age and his projected sentence, are the most consistent predictors of his institutional behavior. Both of these variables are more consistently useful in predicting whether an inmate will be charged with an infraction than they are in estimating the rate at which an inmate will commit such infractions.

Earlier research consistently found that younger inmates present the greatest disciplinary problem, yet the dynamics of the age/infraction relationship are far from clear. Inmates may "age out" in the same way as delinquents in general (Wolfgang, et al., 1972; Hamparian et al., 1978). Older inmates, who may have assumed greater social, financial, or familiar responsibilities in the external world may be less likely to generate problems for institutional officials. Unfortunately, the data base available for this research does not allow us to probe the structure of the age/infraction relationship. We, like others, can only note the existence and the strength of the correlation.

There may be a variety of reasons why inmates in these analyses who had longer projected sentences created discipline problems. Inmates sentenced to long terms may be more dangerous and unmanageable, or such assessments may become self-fulfilling prophesies. Alternatively, those inmates facing

Table 19

Multivariate Models for Minor Infractions

Variable	Odds Ratio (participation)		Standardized Coefficient (infraction rate)
Age (years)	0.41**		-0.25**
Race	0.54**		0.00
Total arrests	1.37*		-0.01
Violent arrests	1.32		0.01
Current offense	0.74		-0.07
Sentence length	2.44**		0.11
Mental Health Problems (Lifetime)			
ASP	1.62**		0.01
Alcohol	1.28		-0.01
Drugs	0.92		0.06
Affective	0.66		-0.07
Anxiety	1.19		0.14*
Pseudo-R squared	0.26 0.07	Adjusted R-squared =	0.06
Mental Health Problems (Recent)			
ASP	2.11**		0.00
Alcohol	1.22		0.04
Drugs	0.84		0.02
Affective	0.39		0.04
Anxiety	1.35		0.09
Pseudo-R squared	0.27 0.07	Adjusted R-squared =	0.05

* $p < .05$
** $p < .01$

Table 20

Summary of the Results*

Independent Variable	Dependent Variable: Participation — Serious	Participation — Moderately Serious	Participation — Substance Abuse	Participation — Minor	Infraction Rate — Serious	Infraction Rate — Moderately Serious	Infraction Rate — Substance Abuse	Infraction Rate — Minor
Age (years)	Y	Y	Y	Y	Y			Y
Race	Y			Y				
Total arrests	Y			Y				
Violent arrests								
Current offense						Y		
Sentence length	Y	Y		Y				
Disorders								
Antisocial personality		Y		Y				
Alcohol abuse			Y			Y		
Drug abuse						Y		
Affective						Y		
Anxiety								Y

* Y indicates that the parameter for the variable had a probability equal to or below .05. For the five disorders, significance for either the lifetime or recent diagnosis resulted in a Y.

longer projected periods of imprisonment may be more likely to adopt the values of an "inmate subculture" that emphasizes independence from societal norms of behavior. Finally, a longer projected sentence may generate certain psychological effects (e.d., high frustration levels) that predispose one to infractions.

The results for other inmate characteristics were not as consistent. Black inmates and those inmates with a longer than average criminal record, however, also seemed to engage in serious and in minor infractions more frequently than other inmates.

Mental Disorders

Analyzing the specific influence of mental disorders on specific types of infractions has been useful. None of the five diagnoses investigated in this research had any impact on an inmate's involvement in serious or violent infractions that constitute a real danger to other inmates or the integrity of the incarcerating institution. Only demographic and criminal career data proved useful in the analysis of serious infractions.

Inmates who were diagnosed as having an antisocial personality disorder, however, were twice as likely as other inmates to engage in moderately serious or substance-related infractions. Also, those inmates with substance problems or affective disorders were charged with moderately serious infractions at higher rates than were other inmates. A recent diagnosis of alcohol dependence or abuse was related to having a substance-abuse infraction, but no variable was related to the intensity with which one engages in substance-related infractions.

The presence of an antisocial personality disorder or an anxiety disorder affected an inmate's involvement in minor infractions. Those with an antisocial personality were more likely to engage in minor infractions, and those with some type of anxiety disorder who engaged in these activities were more intensely involved.

These results, in some ways, mirror the more general findings concerning the relationship between crime and mental disorders (Monahan and Steadman, 1983). One finds no general relationship between all types of disorders and all types of infractions. One finds, instead, selected significant relationships, such as that between an antisocial personality disorder and minor infractions. These selected relationships, however, are rather modest in size, and their usefulness in predictive models is questionable. They hold very limited promise as a tool for correctional administrators seeking "markers" that identify potential discipline problems. The absence of a relationship between mental disorder and serious infractions suggests that inmates with mental disorders are not more likely to be involved in serious disciplinary violations.

Infractions and Individual Characteristics

The research design in this analysis predict infractions stringently tested for usefulness of inmate characteristics to predict infractions. The explanatory power for all models was disappointingly low. The ten

inmate characteristics included in the analyses generally explained between 5 and 10 percent of the variation in the infraction variables.

The data for two inmates with the same mental disorder and behavior may differ because their institutions' disciplinary policies differ. The inmates included in this analysis resided in 80 different institutions in the North Carolina prison system. These institutions may have a variety of different disciplinary regimes, each with its own strategy for defining infractions and charging inmates.

The individual characteristics included in the model may be stronger predictors of infractions when analyzing data for only one institution. The "between-institution" variation in disciplinary styles in this and other research may overwhelm the "within-institution" variation in infractions. It is this "within" institution variation that should be most strongly related to an inmate's individual characteristics. Thus, results reported here may be an incomplete picture of the effects of individual characteristics on infractions.[7]

7/ The data base was inmate oriented. It included all the inmate's infractions at all of the institutions in which he had been housed. With these data, one could not differentiate among infractions that were recorded at different institutions. Had we been able to do so, we would have added facility variables to our models.

All of this is, however, simply conjecture. Each of the 80 institutions included in this research may follow the same fundamental logic in dealing with infractions. Possibly, analyses using these same variables and data from a single institution might be no more powerful than those presented here. However, not until we have further unraveled the sources of, and the comparative importance of, "within" and "between" institution variation in disciplinary records can we make truly meaningful statement about the usefulness of individual inmate characteristics, including mental health status, in predicting inmate behavior.

9. SUMMARY AND IMPLICATIONS

Consideration of the mental disorder/violence relationship can be pursued in a variety of spheres. The American and other legal systems assume that mental disorder sometimes induces violent behavior for which individuals should not be held legally accountable. The mitigation of legal responsibility for violence due to disorder is granted infrequently. On the other hand, the popular imagination attributes a wider responsibility for violence to mental disorder. In part, the popular ascription of blame for violence to mental disorder is a result of the irrational or "subhuman" character of some violence--an attempt to place frightening random or senseless occurrences in some paradigm for understanding.

The psychosocial sciences have also attempted to understand the relationship of mental disorder to violence. Findings have not been clear or consistent, as shown by previous work cited earlier and the results of the various mental disorder/violence models analyzed in this report. The simple, though not very useful, conclusion from previous research and the current work is that some mental disorder types or symptoms are related to and violence. When demographic and other factors are controlled, however, the relationship is not powerful; disorder does not itself account for a substantial proportion of interpersonal violence.

Understanding the mental disorder/violence relationship involves fundamental and formidable conceptual, interpretive, and empirical difficulties. Mental disorder includes diverse conditions such as schizophrenia, anxiety, and substance abuse disorders. Diagnosis of each disorder type is itself complex and involves subjective judgments. Violence is also a heterogeneous phenomenon, both in terms of type and severity; it can involve a fatal attack by a stranger, sexual assault, and physical fights between family or friends. Even when carefully defined, measurement of mental disorder and violence is difficult, both because of the conceptual and empirical complexities and because serious disorder and violence occur rarely in the general population. Previous studies have tended to focus on subjects already formally identified as disordered or violent such as mental patients and inmates of jails or prisons. These are "biased" samples so that the generalizability of research findings is usually problematic. When representative samples are used, study findings are often problematic because the low incidences of mental disorder and violent behavior types do not provide sufficient numbers to support analysis.

The research reported here has attempted to advance understanding of the mental disorder/violence relationship by dealing with a number of

methodological problems of past research. First mental disorder and symptom types have been carefully specified and are used consistently in making diagnoses. The disorder classification system developed by the American Psychiatric Association and published in their Diagnostic and Statistical Manual (Third Edition) (DSM-III) was the basis for an interview questionnaire developed under the sponsorship of the National Institute of Mental Health (NIMH). Version 3 of this interview instrument (the Diagnostic Interview Schedule (DIS)) was used as the basis for classifying mental health status and determining the existence of psychiatric symptoms.

A second feature of this study that has not been characteristic of most past work is the analytic focus on specific disorder and symptom types. Much past work has classified individuals simply as having received mental health treatment. The DIS classifies individuals into 17 disorder categories (present or absent), measures numbers of disorder symptoms present (including specific disorder symptoms present in individuals who are not classified as fully satisfying the criteria for a diagnosis), and specifies whether a disorder has ever been manifested (lifetime) or is currently present (such as within the last six months). The analyses reported here helped clarify the disorder/violence relationship by using specific indicators of disorder and symptoms.

Previous research has typically relied on a single violence measure such as aggressive behavior by inpatient research subjects and rearrest of discharged mental patients. The research reported here used various indicators--self-reports of arrest and fighting, police records of arrest, and incarceration records. Type of violent behavior was also distinguished as expressive (operationalized as assaultive behavior, including homicide, rape, aggravated assault, and fighting) or instrumental (operationalized as robbery, a theft in which force or threat of force is used to take money or goods).

Finally, the research reported here has used multivariate methods to control for multiple sources of variation. This was not done in much past work, so it is often impossible to eliminate alternative hypotheses in assessing the disorder-violence relationship. Younger individuals, for example, are known to engage in some forms of violence more frequently than older individuals. If age variation is not controlled when the disorder/violence relationship is analyzed, interpretation is difficult.

The study has two major methodological limitations. There has been only limited analysis of the temporal relationship between disorder and violence. This analysis in the case of PTSD showed that symptoms usually preceded violence, but the causal inferences that can be made from the analyses reported here are very limited. The characteristics of the sample also limit the inferences that can be drawn from the study. The sample consisted of males recently incarcerated for a serious offense in a state correctional system. Thus, findings are not widely generalizable. A number of factors, however, mitigate this disadvantage:

- the inmate sample includes individuals who have psychiatric disorder and symptom histories and individuals who do not;

- some of the inmates have violence histories; many do not;
- the demographic characteristics of the inmate sample from this single state system are similar to those of state prison inmates generally;
- given the elevated prevalences of disorder and violence histories among the inmates, analyses are less inhibited than usual by low prevalences and resulting small cell sizes.

In summary, while the research reported here has important limitations, it also includes strengths that help advance understanding of the disorder/violence relationship.

The major findings of the study are summarized below.

1. There is some limited evidence of a direct relationship between a lifetime diagnosis of schizophrenia with hallucination symptoms and expressive violence. Because the number of individuals diagnosed as schizophrenic and exhibiting hallucination symptoms is low, these findings should be interpreted cautiously (see pages 19-20).

2. A direct relationship of post traumatic stress disorder (PTSD) and its symptoms to arrest and incarceration for expressive violence was found. Temporal analyses indicated that, for the large majority of subjects who experienced PTSD symptoms and had an arrest history for expressive violence, the symptoms occurred before arrest for violence. This temporal ordering is consistent with viewing PTSD symptoms as etiologically relevant to expressive violence (see pages 36-50).

3. Evidence for a direct relationship between mood disorders (depression, mania, etc.) and violence is inconsistently observed and statistically weak. A consistent relationship of dysthymia (persistent depressed mood) to arrest and incarceration for robbery and adulthood fighting is observed. There is limited evidence of a relationship between mania symptoms and violence (see pages 22-35).

4. Some aspects of problem drinking are directly related to violence, and there is some evidence of an inverse relationship between the problem drinking symptom category of pathological/excessive use and expressive violence. In general, though, evidence for a direct problem drinking/violence relationship is stronger for expressive than for instrumental violence (see pages 51-67).

5. There is some evidence of a direct relationship between inmates' mental health status and their involvement in four different kinds of institutional infractions. Certain types of disorders are associated with some types of infractions, but mental health status explains very little variation in prisoners' infraction records (see pages 67-85).

6. The Monahan and Steadman (1983, 1984) contention that mental disorder and violence vary independently of each other when other factors are controlled is not supported by the evidence they cite and is contradicted by the analyses reported here (see pages 14-18).

The findings can be viewed with some confidence because some known correlates of violence were controlled, specific disorder diagnoses were based on standard, consistently applied, psychiatric nomenclature, and multiple indicators of violence were employed. On the other hand, the capacities of disorders and symptoms that were found related to violence are not powerful in terms of variation accounted for, and the findings may not be widely generalizable due to the study sample.

Implications

There are theoretical and methodological implications that can be drawn from the research. Attention should be paid to the conceptual explication of the disorder/violence relationships reported here. While the empirical evidence for some disorder/violence relationships is clear, theoretical understanding is not well developed. Before the various empirical relationships can be considered to demonstrate the etiological importance of disorder to violence, explanatory mechanisms must be identified and placed in theoretical frameworks. The task is to understand <u>why</u> or under what circumstance the disorder/violence is observed.

The findings of this study demonstrate the value of examining the mental disorder/violence relationship using specific symptom and disorder measures. It is clear that use of very general measures of mental disorder will not help to advance understanding. The foregoing analyses show clearly that only some disorders and some symptoms vary systematically with violent behavior. Similarly, interpersonal violence includes a variety of behaviors. This report has attempted to distinguish expressive and instrumental violence and has relied on a variety of data sources such as self-reports, and arrest and incarceration records. Findings have demonstrated that disorder/violence relationships depend in part on which violence measure is used.

Future study of the mental disorder/violence relationship may be advanced by attempts to replicate some of the analyses reported here. The results of replicative research, especially using nonprison inmate study subjects, testing alternative indicators of violence, and conducting temporal analyses will suggest whether the results reported here are robust. Replications will also provide guidance for theoretical development to understand the reasons why or how some mental states and symptoms raise the risk of violent behavior. Complex explanatory schemes are likely to be required.

At least two public policy implications can be drawn from the findings of this research. Both are derivable from the findings that (1) disorder or disorder symptoms are sometimes important risk factors for violence, but (2) in the aggregate, disorder does not by itself account for a large dis-

proportion of violence. Because disorder is not a powerful "marker" variable, its potential to direct public policies aimed at controlling violence is limited. The relationships are simply not strong enough to warrant attempts to control violence by a general focus on mental disorder. There are many good reasons to invest in palliative actions for individuals who have mental problems, and to focus on specific risk categories that are associated with violence. However, the hope of reducing the level of societal violence through such actions is not a realistic expectation.

Finally, public concern that current or former mental patients account for a large disproportion of interpersonal violence exaggerates the risk. Individuals who can speak publically and authoritatively about the risk of violence induced by mental disorder should characterize that risk accurately. The public should be made aware that only some features of disorder elevate violence risk, and that even these risk factors are weak predictors and probably operate in concert with other individual, situational, and structural factors.

APPENDIX A

DRUG ABUSE/DEPENDENCE AND VIOLENCE

The inmates in the sample were classified according to whether they satisfied the DSM-III criteria for a lifetime diagnosis of substance abuse or dependence of five types of drugs. The diagnosis is given if there is evidence of pathological use, impairment in social or occupational functioning, or tolerance.

Type of Drug Abuse/Dependence	Lifetime Prevalence
opioids	9.2%
cocaine	2.5
amphetamine	6.7
barbiturates	5.9
marijuana	17.5

Six logistic regression models were estimated--one for each of the six indicators of violence shown in the previous sections. Individuals were classified as having a particular drug disorder (1) or not (0) for each drug type. Dichotomous indicators for each of the five drug disorder types were included in the six models.

In general, the modeling showed little evidence of a direct relationship between the various drug disorders and violence, and there was some limited evidence of an inverse relationship between opioid abuse/dependence and expressive violence. One clear indication of a direct relationship between opioid abuse/dependence and violence was observed. Individuals satisfying the criteria for a lifetime diagnosis of opioid abuse or dependence were significantly more likely ($p<.01$) to have an arrest history for robbery when variation accounted for by demographic factors and the other four drug disorder variables was controlled. This finding is consistent with the frequently observed relationship between frequent use of heroin and involvement in income-generating crime (Ball, Rosen, Flueck, and Nurco, 1981; Chaiken and Chaiken, 1982; Collins, Hubbard, and Rachal, 1985). But robbery aside, a drug disorder diagnosis does not appear to contribute to violent behavior.

REFERENCES

Adams, K. (1983). Former mental patients in a prison and parole system: A study of socially disruptive behavior. Criminal Justice and Behavior, 10(3), 358-384.

Alfaro, J.D. (1981). Report on the relationship between child abuse and neglect and later deviant behavior. In J.D. Burchard & S.N. Burchard (Eds.), Prevention of delinquent behavior (pp. 175-219). Beverly Hills, CA: Sage.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd ed. rev.). DSM III-R. Washington, DC: Author.

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). DSM-III. Washington, DC: Author.

American Psychiatric Association. (1968). Diagnostic and statistical manual of mental disorders (DSM-II). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (1952). Diagnostic and statistical manual of mental disorders. Washington, DC: Author.

Amir, M. (1967). Alcohol and forcible rape. British Journal of Addiction, 62, 219-232.

Anthony, H.S. (1968). The association of violence and depression in a sample of young offenders. British Journal of Criminology, 8, 346-365.

Anthony, J.C., Folstein, M., Romanoski, A.J., Vonkorff, M.R., Nestadt, G.R., Chahal, R., Merchant, A., Brown, C.H., Shapiro, S., Kramer, M., & Gruenberg, E.M. (1985). Comparison of the lay Diagnostic Interview Schedule and the standardized psychiatric diagnosis. Archives of General Psychiatry, 42, 667-676.

Apostle, D.T. (1980). The unconscious defense as applied to post traumatic stress disorder in a Vietnam veteran. Bulletin of the American Academy of Psychiatry and Law, 8(4), 426-430.

Bailey, S.L., & Collins, J.J. (forthcoming). A refinement of alcohol disorder measures and a test of their relationship to violent behavior. Research Triangle Park, NC: Research Triangle Institute.

Ball, J.C., Rosen, L., Flueck, J.A., & Nurco, D.N. (1981). The criminality of heroin addicts when addicted and when off opiates. In J.A. Inciardi (Ed.), The drugs-crime connection (pp. 39-65). Beverly Hills, CA: Sage.

Bauermeister, M. (1980). Is fighting normal, delinquent, or a sign of mental illness? International Journal of Offender Therapy, 24, 149-161.

Beck, A.J., & Hester, T. (1986). Prison admissions and releases, 1983 (NCJ-100582). BJS Special Report. Washington, DC: U.S. Department of Justice.

Bland, R., & Orn, H. (1986). Family violence and psychiatric disorder. Canadian Journal of Psychiatry, 31, 129-137.

Blumstein, A., Cohen, J., Roth, J.A., & Visher, C.A. (1986). Criminal careers and "career criminals" (Vol. 1). Washington, DC: National Academy Press.

Boman, B. (1986). Combat stress, post-traumatic stress disorder, and associated psychiatric disturbance. Psychosomatics, 27(8), 567-573.

Bonta, J., & Nanckivell, G. (1980). Institutional misconduct and anxiety levels among jailed inmates. Criminal Justice and Behavior, 7, 203-214.

Brown, B., & Spevacek, J. (1971). Disciplinary offenses and offenders at two differing correctional facilities. Correctional Psychiatry and Journal of Social Therapy, 17, 48-56.

Bureau of Justice Statistics. (1981). Veterans in prison. Washington, DC: U.S. Department of Justice.

Bureau of Justice Statistics. (1983). Prisoners and alcohol (NCJ-86223). Washington, DC: U.S. Department of Justice.

Bureau of Justice Statistics. (1985). Jail inmates 1983 (NCJ-99175). BJS Special Report. Washington, DC: U.S. Department of Justice.

Bureau of Justice Statistics. (1986). Prison Admissions and Releases, 1983 (NCJ-100582). BJS Special Report. Washington, DC: U.S. Department of Justice.

Bureau of Justice Statistics. (1987). Prisoners in 1986 (NCJ-104864). Washington, DC: U.S. Department of Justice.

Burgess, A.W., & Holmstrom, L.L. (1979). Rape: Sexual disruption and recovery. American Journal of Orthopsychiatry, 49(4), 648-657.

Bybee, R.W. (1979). Violence toward youth: A new perspective. Journal of Social Issues, 35, 1-14.

Byles, J.A. (1978). Violence, alcohol problems and other problems in disintegrating families. Journal of Studies on Alcohol, 39, 551-553.

Carpenter, J.A., & Armenti, N.P. (1972). Some effects of ethanol on human sexual and aggressive behavior. In B. Kissin & H. Begleiter (Eds.), The biology of alcoholism (Vol. 2) (pp. 510-543). New York: Plenum Press.

Cattell, R.B. (1966). The Scree Test for the number of factors. Multivariate Behavioral Research, 1, 245-276.

Centers for Disease Control. (1986). Homicide-Los Angeles, 1970-1979. Morbidity and Mortality Weekly Report, 35, 61-65.

Chaiken, J., & Chaiken, M. (1982). Varieties of criminal behavior. Santa Monica, CA: Rand.

Cocozza, J.J., Melick, M.E., & Steadman, H.J. (1978). Trends in violent crime among ex-mental patients. Criminology, 16, 317-334.

Cohen, C.I. (1980). Crime among mental patients--A critical analysis. Psychiatric Quarterly, 52(2), 100-107.

Collins, J.J. (forthcoming). Problem drinking and violence. In M.E. Wolfgang & N.A. Weiner (Eds.), Violent crime, Violent criminals. Beverly Hills, CA: Sage.

Collins, J.J. (Ed.). (1981). Drinking and crime: Perspectives on the relationship between alcohol consumption and criminal behavior. New York: Guilford.

Collins, J.J. (1986). The relationship of problem drinking to individual offending sequences. In A. Blumstein, J. Cohen, J.A. Roth, & C.A. Visher (Eds.), Criminal careers and "career criminals (Vol. 2) (pp. 89-120). Washington: National Academy Press.

Collins, J.J., Hubbard, R.L., & Rachal, J.V. (1985). Expensive drug use and illegal income: A test of explanatory hypotheses. Criminology, 23(4), 743-764.

Collins, J.J., & Schlenger, W. (1983, November). The prevalence of psychiatric disorder among admissions to prison. Paper presented at the American Society of Criminology, Denver, CO.

Collins, J.J., & Schlenger, W.E. (1988). Acute and chronic effects of alcohol use on violence. Journal of Studies on Alcohol, 49.

Collins, J.J., Schlenger, W.E., & Jordon, B.K. (1988). Antisocial personality and substance abuse disorders. Bulletin of the American Academy of Psychiatry and Law, 16(2), 187-198.

Craig, T.J. (1982). An epidemiologic study of problems associated with violence among psychiatric inpatients. American Journal of Psychiatry, 139, 1262-1266.

Emerson, C.D. (1979). Family violence: A study by the Los Angeles County Sheriff's Department. Police Chief, 46, 48-50.

Escobar, J.I., Randolph, E.T., Puente, G., Spiwak, F., Asamen, J.K., Hill, M., & Hough, R.L. (1983). Post-traumatic stress disorder in Hispanic Vietnam veterans. Journal of Nervous and Mental Disease, 171(10), 585-596.

Federal Bureau of Investigation. (1988). Crime in the United States - 1987. Washington, DC: Author.

Flanagan, T. (1983). Correlates of institutional misconduct among state prisoners. Criminology, 21(1), 29-39.

Foucault, M. (1965). Madness and civilization: A history of insanity in the age of reason. New York: Random House.

Gaes, G. (1985). The effects of overcrowding in prisons. In N. Morris, & M. Tonry (Eds.), Crime and justice: An annual review of research. Chicago: University of Chicago Press.

Gaes, G., & McGuire, W. (1985). Prison violence: The contribution of crowding versus other determinants of prison assault rates. Journal of Research in Crime and Delinquency, 22, 41-65.

Gerson, L.W. (1978). Alcohol-related acts of violence: Who was drinking and where the acts occurred. Journal of Studies on Alcohol, 39, 1294-1296.

Gibbs, J.J. (1978). Stress and self-injury in jail. Ann Arbor, MI: University Microfilms International.

Giovannoni, J.M., & Gorel, L. (1967). Socially disruptive behavior of ex-mental patients. Archives of General Psychiatry, 17(2), 146-153

Goldberg, D.P. (1978). The manual of the General Health Questionnaire. Windsor, Canada: NFER.

Goodwin, D.W., Crane, J.B., & Guze, S. (1971). Felons who drink: An 8-year followup. Quarterly Journal of Studies on Alcohol, 32, 136-147.

Grant, B.L., & Coons, D.J. (1983). Guilty verdict in a murder committed by a veteran with post-traumatic stress disorder. Bulletin of the American Academy of Psychiatry and Law, 11(4), 355-358.

Grislain, J.R., Mainard, R., deBerranger, P., deFerron, C., & Brelet G. (1968). Les sévices commis sur les enfants: Problèmes sociaux et juridiques. Annales de Pédiatrie, 15, 440-448.

Guy, E., Platt, J., Zwerling, I., & Bullock, S. (1985). Mental health status of prisoners in an urban jail. Criminal Justice and Behavior, 12(1), 29-53.

Guze, S.B. (1976). Criminality and psychiatric disorders. New York: Oxford University Press.

Guze, S.B., Tuason, V., Gatfield, P., Stewart, M., & Picken, B. (1962). Psychiatric illness and crime with particular reference to alcoholism: A study of 223 criminals. Journal of Nervous and Mental Diseases, 134, 512-521.

Hafner, H., & Boker, W. (1973). Mentally disordered violent offenders. Social Psychiatry, 8, 220-229.

Hamparian, D., Schuster, R., Dinitz, S., & Conrad, J. (1978). The violent few: A study of dangerous juvenile offenders. Lexington, MA: Lexington Books.

Hare, R.D. (1983). Diagnosis of antisocial personality disorder in two prison populations. American Journal of Psychiatry, 140, 887-890.

Harrer, G., & Kofler-Westergren, B. (1986). Depression and criminality. Psychopathology, 19 (suppl 2), 215-219.

Helzer, J.E., Robins, L.N., & McEvoy, L. (1987). Post-traumatic stress disorder in the general population: Findings of the Epidemiologic Catchment Area Survey. New England Journal of Medicine, 317, 1630-1634.

Helzer, J.E., Robins, L.E., McEvoy, L.T., Spitznagel, E.L., Stoltzman, R.K., Farmer, A., & Brockington, I.F. (1985). A comparison of clinical and Diagnostic Interview Schedule diagnoses. Archives of General Psychiatry 42(7), 657-666.

Hendricks, L.E., Bayton, J.A., Collins, J.L., Mathura, C.B., McMillan, S.R., & Montgomery, T.A. (1983). The NIMH Diagnostic Interview Schedule: A test of its validity in a population of black adults. Journal of the National Medical Association, 75(7), 667-671

Hesselbrock, V., Stabenau, J., Hesselbrock, M., Mirkin, P., & Meyer, R. (1982). A comparison of two interview schedules. Archives of General Psychiatry, 39, 674-677.

Hilberman, E., & Munson, K. (1977-1978). Sixty battered women. Victimology, 2, 460-470.

Howells, K. (1982). Mental disorder and violent behavior. In P. Feldman (Ed.), Developments in the study of criminal behavior (Vol. 2). New York: Wiley.

Innes, C.A. (1988). Profile of state prison inmates, 1986 (NCJ-109926). BJS Special Report. Washington: U.S. Department of Justice.

Institute for Scientific Analysis. (1978). Drinking patterns and criminal careers: A study of 310 imprisoned male felons. Final report prepared for the National Institute on Alcohol Abuse and Alcoholism. San Francisco: ISA.

James J., Gregory, D., & Jones, R. (1980). Psychiatric morbidity in prisons. Hospital and Community Psychiatry, 31(10), 674-677.

Johnson, S.D., Gibson, L., & Linden, R. (1978). Alcohol and rape in Winnipeg, 1966-1975. Journal of Studies on Alcohol, 39, 1887-1894.

Kaufman, J., & Zigler, E. (1987). Do abused children become abusive parents? American Journal of Orthopsychiatry, 57, 186-192.

Kilpatrick, D.G., Resick, P.A., & Veronen, L.J. (1981). Effects of a rape experience: A longitudinal study. Journal of Social Issues, 37(4), 105-122.

King, L.J., Murphy, G., Robins, L.N., & Darvish, H. (1969). Alcohol abuse: A crucial factor in the social problems of Negro men. American Journal of Psychiatry, 125, 1682-1690.

Klassen, D., & O'Connor, W.A. (1988). Predicting violence in schizophrenic and non-schizophrenic patients: A prospective study. Journal of Community Psychology, 16, 217-227.

Kozol, H.L., Boucher, R.J., & Garofalo, R.F. (1972). The diagnosis and treatment of dangerousness. Crime and Delinquency, 18, 371-392.

Krakowski, M., Jaeger, J., & Volavka, J. (1988). Violence and psychopathology: A longitudinal study. Comprehensive Psychiatry, 29(2), 174-181.

Kulka, R.A., Schlenger, W.E., Fairbank, J.A., Hough, R.L., Jordan, B.K., Marmar, C.R., & Weiss, D.S. (1988). National Vietnam Veterans Readjustment Study. Findings from the National Study of the Vietnam Generation (RTI/3035/10-01F). Research Triangle Park, NC: Research Triangle Institute.

Lamb, H.R., & Grant, R.W. (1982). The mentally ill in an urban county jail. Archives of General Psychiatry, 29, 17-22.

Langevin, R., Ben-Aron, M., Wortzman G., Dickey, R., & Handy, L. (1987). Brain damage, diagnosis, and substance abuse among violent offenders. Behavioral Sciences and the Law 5(1), 77-94.

Laufer, R.S., Gallops, M.S., & Frey-Wouters, E. (1984). War stress and trauma: The Vietnam experience. Journal of Health and Social Behavior, 25, 65-85.

Lewis, D.O., Shanok, S.S., Pincus, J.H., & Glaser, G.H. (1979). Violent juvenile delinquents: Psychiatric, neurological, psychological, and abuse factors. Journal of the American Academy of Child and Adolescent Psychiatry, 18, 307-319.

Lindelius, R., & Salum, I. (1973). Alcoholism and criminality. Acta Psychiatrica Scandinavica, 49, 306-314.

Lurigio, A.J., & Lewis, D.A. (1987). The criminal mental patient. A descriptive analysis and suggestions for future research. Criminal Justice and Behavior, 14(3), 268-287.

Lyons, H.A. (1972). Depressive illness and aggression in Belfast. British Medical Journal 1, 342-344.

Marciniak, R.D. (1986). Implications to forensic psychiatry of post-traumatic stress disorder: A review. Military Medicine, 151(8), 434-437.

Mayfield, D. (1976). Alcoholism, alcohol intoxication, and assaultive behavior. Diseases of the Nervous System, 37, 228-291.

Mayfield, D., & Allen, D. (1967). Alcohol and affect: A psychopharmacological study. American Journal of Psychiatry, 123, 1346-1351.

McCord, J.F. (1983). Alcohol in the service of aggression. In E. Gottheil, K.A. Druley, T.E. Skoloda, & H.A. Waxman (Eds.), Alcohol, drug abuse, and aggression (pp. 270-279). Springfield, IL: Charles Thomas.

Melick, M.E., Steadman, H.J., & Cocozza, J.J. (1979). The medicalization of criminal behavior among mental patients. Journal of Health and Social Behavior, 20, 228-237.

Menzies, R.J., & Webster, C.D. (forthcoming). Mental disorder and violent crime. In N.A. Weiner & M.E. Wolfgang (Eds.), Pathways to Criminal Violence. Beverly Hills, CA: Sage.

Meyer, C. K., Magedanz, T., Kieselhorst, D.C., & Chapman, S.C. (1978). A social-psychological analysis of police assailants. Norman: University of Oklahoma Bureau of Government Research.

Monahan, J., & Steadman, H. (1983). Crime and mental disorder: An epidemiological approach. In N. Morris & M. Tonry (Eds.), Crime and justice: An annual review of research. Chicago: University of Chicago Press.

Monahan, J., & Steadman, H.J. (1984). Crime and mental disorder. NIJ Special Report. Washington, DC: National Institute of Justice.

Mulvey, E.P., Blumstein, A., & Cohen, J. (1986). Reframing the research questions of mental patient criminality. International Journal of Law and Psychiatry, 9, 57-65.

Myers, L., & Levy, G. (1978). Description and prediction of the intractable inmate. Journal of Research in Crime and Delinquency, 15, 214-228.

Nathan, P.E., Lowenstein, L.H., Solomon, P., & Rossi, A.M. (1970). Behavioral analysis of chronic alcoholism. Archives of General Psychiatry, 22, 419-430.

Neighbors, H.W., Williams, D.H., Gunnings, T-S., Lipscomb, W.D., Broman, C., & Lepkowski, J. (1987). The prevalence of mental disorder in Michigan prisons. A Final Report Submitted to the Michigan Department of Corrections. Ann Arbor: The Survey Research Center, Institute for Social Research, University of Michigan.

Pelissier, B. (1987, November). The effects of a rapid increase in prison population: A pre- and post-test study. Paper presented at the American Society of Criminology Meetings, Montreal, Canada.

Pernanen, K. (1976). Alcohol and crimes of violence. In B. Kissin & H. Begleiter (Eds.), The biology of alcoholism (Vol. 4). New York: Plenum Press.

Pernanen, K. (1979, November). Experiences of violence and their association with alcohol use in general population of a community. Paper presented at the annual meeting of the American Society of Criminology, Philadelphia.

Pernanen, K. (1981). Theoretical aspects of the relationship between alcohol and crime. In J.J. Collins (Ed.), Drinking and crime: Perspectives on the relationship between alcohol consumption and criminal behavior (pp. 1-69). New York: Guilford Press.

Petersilia, J., Greenwood, P.W., & Lavin, M. (1978). Criminal careers of habitual felons. Washington, DC: National Institute of Law Enforcement and Criminal Justice.

Peterson, M.A., & Braiker, H. (1980). Doing crime: A survey of California prison inmates. Santa Monica, CA: Rand.

Pfouts, J.H., Schopler, J.H., & Henley, C.H. (1981). Deviant behaviors of child victims and bystanders in violent families. In J.D. Burchard & S.N. Burchard (Eds.), Prevention of delinquent behavior (pp. 79-99). Beverly Hills, CA: Sage.

Phillips, M.R., Wolf, A.S., & Coons, D.J. (1988). Psychiatry and the criminal justice system: Testing the myths. American Journal of Psychiatry, 145(5), 605-610.

Planansky, K., & Johnston, R. (1977). Homicidal aggression in schizophrenic men. Acta Psychiatrica Scandinavica, 35, 65-73.

Rabkin, J.G. (1979). Criminal behavior of discharged mental patients: A critical appraisal of research. Psychological Bulletin, 86, 1-27.

Rada, R.T. (1975). Alcoholism and forcible rape. American Journal of Psychiatry, 132, 444-446.

Rappaport, J.R., & Lassen, G. (1965). Dangerousness--Arrest rate comparisons of discharged patients and the general population. American Journal of Psychiatry, 121, 776-783.

Reiss, A.J., Jr. (1988). Co-offending and criminal careers. In M. Tonry, & N. Morris (Eds.), Crime and justice (Vol. 10) (pp. 117-170). Chicago: University of Chicago Press.

Robins, L.N. (1972). An actual evaluation of the causes and consequences of deviant behavior in young black men. In M.F. Roff, L. Robins, & Max Pollack (Eds.), Life history research in psychopathology (Vol. 2) (pp. 137-154). Minneapolis: University of Minnesota Press.

Robins, L.N. (1978). Aetiological implications in studies of childhood histories relating to antisocial personality. In R.D. Hare & D. Schalling (Eds.), Psychopathic behavior: Approaches to research (pp. 255-271). New York: John Wiley.

Robins, L.N., Helzer, J.E., Croughan, J., & Ratcliff, K.S. (1981). National Institute of Mental Health Diagnostic Interview Schedule. Archives of General Psychiatry, 38, 381-389.

Robins, L.N., Helzer, J.E., Ratcliff, K.S., & Seyfried, W. (1982). Validity of the Diagnostic Interview Schedule, Version II: DSM-III diagnoses. Psychological Medicine 12, 855-870.

Robins, L.N., Murphy, G.E., & Breckenridge, M.B. (1968). Drinking behavior of young urban Negro men. Quarterly Journal of Studies on Alcohol, 29, 657-684.

Robins, L.N., & Wish, E. (1977). Childhood deviance as a developmental process: A study of 223 black men from birth to 18. Social Forces, 56, 448-473.

Roizen, J., & Schneberk, D. (1977). Alcohol and crime. In M. Aarens, T. Cameron, J. Roizen, R. Roizen, R. Room, D. Schneberk, & D. Wingard (Eds.), Alcohol, casualties and crime. Berkeley, CA: Social Research Group.

Roslund, B., & Larson, C.A. (1979). Crimes of violence and alcohol abuse in Sweden. International Journal of the Addictions, 14, 1103-1115.

Rounsaville, B.J. (1978). Theories in marital violence: Evidence from a study of battered women. Victimology, 3, 11-31.

SAS Institute. (1979). SAS User's Guide. Cary, NC: SAS Institute.

Schuckit, M.A., Herrman, G., & Schuckit, J.J. (1977). The importance of psychiatric illness of newly arrested prisoners. Journal of Nervous and Mental Diseases, 165(2), 118-125.

Shaw, D.M., Churchill, C.M., Noyes, R., & Loeffelholz. (1987). Criminal behavior and post-traumatic stress disorder in Vietnam veterans. Comprehensive Psychiatry, 28, 403-411.

Shupe, L.M. (1954). Alcohol and crime. Journal of Criminal Law, Criminology, and Police Science, 44, 661-664.

Sosowsky, L. (1978). Crime and violence among mental patients reconsidered in view of the new legal relationship between the state and the mentally ill. American Journal of Psychiatry, 135(1), 33-42.

Sparr, L.F., Reaves, M.C., & Atkinson, R.M. (1987). Military combat, posttraumatic stress disorder, and criminal behavior in Vietnam veterans. Bulletin of the American Academy of Psychiatry and the Law, 15, 141-162.

Steadman, H.J. (1987). How well can we predict violence for adults? A review of the literature and some commentary. In F.N. Dutile & C.H. Foust (Eds.), The prediction of criminal violence. Springfield, IL: Charles C. Thomas, 5-16.

Steadman, H.J., & Felson, R.B. (1981). Differences in self-reported aggression and physical violence among ex-mental patients, ex-offenders, and the general population. Albany: State University of New York.

Steketee, G., & Foa, E.G. (1987). Rape victims: Post-traumatic stress responses and their treatment: A review of the literature. Journal of Anxiety Disorders, 1, 69-86.

Stratton, J.G., Parker, D.A., & Snibbe, J.R. (1984). Post-traumatic stress: Study of police officers involved in shootings. Psychological Reports, 55, 127-131.

Swank, G.E., & Winer, D. (1976). Occurrence of psychiatric disorder in a county jail population. American Journal of Psychiatry, 133(11), 1331-1333.

Szasz, T. (1970). The manufacture of madness. New York: Dell.

Tardiff, K. (1985). Patterns and major determinants of homicide in the United States. Hospital and Community Psychiatry, 36, 632-639.

Taylor, P.J. (1982). Schizophrenics and violence. In J. Gunn & D.P. Farrington (Eds.), Abnormal offenders, delinquency and the criminal justice system. New York: John Wiley.

Taylor, P.J. (1986). The risk of violence in psychotics. Integrated Psychiatry, 4, 12-24.

Teplin, L.A. (1985). The criminality of the mentally ill: A dangerous misconception. American Journal of Psychiatry, 142(5), 593-599.

Teplin, L.A. (1984). Criminalizing mental disorder. The comparative arrest rate of the mentally ill. American Psychologist, 39(7), 794-803.

Thompson, W.D., & Weissman, M.M. (1981). Quantifying lifetime risk of psychiatric disorder. Journal of Psychiatric Research, 16, 113-126.

Valdiserri, E.V., Carroll, K.R., & Hartl, A.J. (1986). A study of offenses committed by psychotic inmates in a county jail. Hospital and Community Psychiatry, 37, 163-166.

Van Putten, T., & Emory, W.H. (1973). Traumatic neuroses in Vietnam returnees. Archives of General Psychiatry, 29(11), 695-698.

Virkkunen, M. (1977). Arrests for drunkenness and recidivism in juvenile delinquents. British Journal of Addictions, 72, 201-204.

Voss, H.L., & Hepburn, J.R. (1968). Patterns in criminal homicide in Chicago. Journal of Criminal Law, Criminology, and Police Science, 59, 499-508.

Weller, R.A., Penick, E.C., Powell, B.J., Othmer, E., Rice, A.S., & Kent, T.A. (1985). Agreement between two structured psychiatric diagnostic interviews: DIS and the PDI. Comprehensive Psychiatry, 26(2), 157-163.

Wenet, G., Clark, T.R., & Hunner, R.J. (1981). Perspectives on the Juvenile sex offender. In J.D. Burchard & S.N. Burchard (Eds.), Prevention of delinquent behavior (pp. 145-151). Beverly Hills, CA: Sage Publications.

Wilson, J.P., & Zigelbaum, S.D. (1983). The Vietnam veteran on trial: The relation of post-traumatic stress disorder to criminal behavior. Behavioral Sciences and the Law, 1, 69-83.

Wolfgang, M.E. (1958). Patterns in criminal homicide. Philadelphia: University of Pennsylvania.

Wolfgang, M., Figlio, R., & Sellin, T. (1972). Delinquency in a birth cohort. Chicago: University of Chicago Press.

Wolfgang, M.E., Thornberry, T.P., & Figlio, R.M. (1987). From boy to man, from delinquency to crime. Chicago: University of Chicago Press.

Yager, T., Laufer, R.S., & Gallops, M.S. (1984). Some problems associated with war experience in men of the Vietnam generation. Archives of General Psychiatry, 41, 327-333.

Yesavage, J.A. (1983). Bipolar illness: Correlates of dangerous inpatient behavior. British Journal of Psychiatry, 143, 554-557.