Out and Down:
The Effects of Incarceration on Psychiatric Disorders and Disability

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Abstract

Although psychiatric disorders are common among current and former inmates, a putative causal relationship is contaminated by assorted influences, including childhood disadvantage, the early onset of most disorders, and the criminalization of substance use, which is itself comorbid with a variety of other subsequent psychiatric disorders. Using the National Comorbidity Survey Replication, this study examines the relationship after statistically adjusting for these powerful and multidimensional selection processes. The analysis reveals a positive association between incarceration and both current and lifetime psychiatric disorders, while helping to unpack its underpinnings. Results indicate that (i) some of the most common disorders found among former inmates emerge in childhood and adolescence; (ii) the effects of incarceration dissipate somewhat over time, having a smaller impact on current disorders than lifetime disorders; and (iii) substance disorders anticipate both other psychiatric disorders and incarceration. Yet the results also reveal robust incarceration effects on certain disorders, which are no less consequential for being specific. In particular, incarceration has a robust relationship with subsequent mood disorders, related to feeling "down", including major depressive disorder, bipolar disorder, and dysthymia. These disorders, in turn, are strongly related to social and economic disability. Indeed, mood disorders explain much of the additional social disability former inmates experience following release. For those concerned with prisoner reintegration, mood disorders may be an important—and generally neglected—consideration.

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Incarceration has risen dramatically over the last thirty years and sociologists are beginning to understand its consequences for life chances and, more recently, health (Massoglia and Schnittker 2009; Schnittker and John 2007; Wakefield and Uggen 2010). To date, social scientists have documented many negative effects across multiple domains, but understanding the effects on psychiatric disorders in particular presents a real opportunity for medical sociologists to integrate seemingly disparate areas of research, including research on stratification, criminalization, the life-course, and the sociology of mental health. Literatures on the effects of institutionalization and stigma predicts negative effects of incarceration and, given the effects of psychiatric disorders on disability, it is possible that psychiatric disorders explain at least some fraction of the difficulties former inmates experience after their release. Certainly an implicit theme of the reintegration literature is the difficulties former inmates experience in trying to cope with their incarceration while simultaneously reassuming and renewing social roles (Travis 2005), which aligns the literature with some research on psychiatric disability. Yet the relationship between incarceration and psychiatric disorders also presents a particularly complicated set of empirical concerns, especially related to the life-course dimensions of incarceration. Both incarceration and psychiatric disorders are rooted in early childhood experiences, potentially explaining their association in adulthood but undermining any effect of incarceration. The criminalization of many common psychiatric disorders, especially related to substance abuse, further underscores this possibility, suggesting many inmates end up in prison

at least partially as a result of their disorder. Beyond these considerations, it is not entirely clear for which disorders incarceration might matter most, requiring a multidimensional approach to outcomes, which is a hallmark of the sociological approach to mental health (Aneshensel, Rutter, and Lachenbruch 1991).

Exploring the effects of incarceration on psychiatric disorders demands a great deal. In this study we explore the relationship between lifetime incarceration and an array of common psychiatric disorders, all while utilizing data sensitive to the life-course dimensions of psychiatric disorders. In addition to exploring the effects of incarceration on psychiatric disorders, we also examine whether such disorders help explain some fraction of incarceration's other deleterious social effects. We do so using the National Comorbidity Survey Replication (NCS-R), a nationally representative survey of psychiatric disorders in the United States, which includes elements necessary for a rigorous investigation, including a measure of disability spanning cognitive, emotional, and social dimensions (Kessler et al. 2006; Kessler and Merikangas 2004; Kessler and Ustun 2004). Understanding the effects of incarceration of mental health begins with understanding the rise of incarceration.

The Rise of Incarceration and the Shadow of the Total Institution

The incarceration rate has increased precipitously in the United States of the last forty years, leaving growing numbers of people with some lifetime contact with prisons or jails (Wacquant 2009). In 1980, the incarceration rate was 149 per 100,000, whereas in 2009 the same rate was five times as high at 749 (U.S. Department of Justice 2005; West 2010). The vast majority

of those in prison will be release, and all told, more than 700,000 people reenter their communities from prison every year (West and Sabol 2009). Considering the stock and flow of inmates, Uggen, Manza, and Thompson (2006) estimate that about 7.5% of the adult population—approximately 16 million people—are felons or ex-felons, a figure that approximates the number of unemployed persons during the economic recession of 2008 to 2009 (Wakefield and Uggen 2010). The rise of incarceration in the US may be unusual from many standpoints, but incarceration is no longer uncommon and, if it is to be considered a type of stress, medical sociologists should not consider it an especially rare one.

What, however, are the effects of incarceration on mental health? The potential relevance of incarceration for mental health is large, but its effects are nevertheless uncertain and must be appreciated in a broader epidemiological and institutional context. While there has been some research on the effects of incarceration on mental health, much more research has been devoted to the mental health of current inmates than the long-term consequences of prior incarceration, which is potentially a more important topic given the churning of the prison system. Figure 1 provides a framework for understanding the effects of incarceration on the psychiatric disorders and, in turn, the effects of psychiatric disorders on disability. The figure presents a number of elements and pathways that will be considered shortly, but the immediate question is whether there is a pathway from incarceration to psychiatric disorders, a pathway lying at the center of the figure.

This pathway has received attention in the form of conceptual work on the effects of total institutions more generally and from descriptive research on the prevalence of psychiatric

disorders in prisons. Goffman (1961) was perhaps the first to conceptually formalize the effects of living in a total institution on mental health, but research on the social structure of prison life predates his work (Weinberg 1942) and subsequent work has focused specifically on *prisonization* as a particular form of coping (Sykes 1958; Wheeler 1961). More recent studies document in a thorough way the many adjustments inmates make to life in prison and the repercussions of those adjustments for well-being (Adams 1992; Bukstel and Kilmann 1980; Haney 2003; Haney 2006). Whether reflected in Goffman work on total institutions or more recent investigations on prisonization, the stress of life in prison remains clear: in being denied their freedom, autonomy, features of their identity, and many goods and services, inmates often suffer high levels of anxiety and distress. The prevalence of psychiatric disorders within prisons is, by most accounts, relatively high (Fazel and Danesh 2002; Wilper et al. 2009). About one in ten inmates experience major depression and, among male inmates, one in two experiences antisocial personality disorder (Fazel and Danesh 2002). By some estimates, most returning inmates exhibit some type of psychiatric disorder, even if a large fraction of those cases are undiagnosed (Mallik-Kane and Visher 2008). Other studies estimate a diagnosed prevalence of 15 to 26 percent (Ditton 1999; Wilper et al. 2009), but characterize mental health problems as "ubiquitous" relative to the general population (Wilper et al. 2009, p. 669), a conclusion echoed in a report to Congress on the health of soon-to-be-released inmates, perhaps the most comprehensive study of its kind (National Commission on Correctional Health Care 2002).

Although these studies focus on current inmates, the effects of incarceration on psychiatric disorders are likely also related to experiences after release. A major theme of the

reintegration literature is the related to the difficulty of reintegration into traditional social roles, rooted partly in discrimination (Pager 2008). If incarceration is causally related to these difficulties and these difficulties are also related to psychiatric disorders, then the total effects of incarceration will reflect both experiences occurring within prison and experiences resulting from a prior prison sentence. Consistent with this intuition, research on the health effects of incarceration finds the length of incarceration is only weakly related to health after adjusting for whether someone spent any time in prison (Massoglia 2008; Schnittker and John 2007).

From a descriptive standpoint the high prevalence of psychiatric disorders among current and former inmates seems clear, but it is unclear this elevated prevalence reflects. The problem stems in large part from the focus of many studies: most of the conceptual research focuses on life in the total institution and much of the descriptive work focuses on the mental health of current inmates, but research on the social origins of crime and psychiatric disorders focuses increasingly on the early developmental antecedents of each. Figure 1 presents these influences to the left of incarceration, exerting an influence on incarceration, but also outcomes further down the pathway. One important feature of the figure is the centrality of childhood disadvantage to many of the outcomes appearing on the right. To the degree that childhood disadvantage is associated with both incarceration and adult psychiatric disorders, the apparent relationship between the two may be confounded and there is, in fact, considerable evidence linking childhood disadvantage to a host of behavioral problems. Childhood adversities have been linked to many types of psychiatric disorders throughout adulthood (Green et al. 2010) and,

likewise, have been linked to the early onset of delinquency and the stability of criminal behavior over the life course (Sampson and Laub 1992).

Moving to the right of childhood disadvantage, it is also the case that many psychiatric disorders emerge early in life and will predate adult incarceration (Kessler et al. 2005; Kessler and Wang 2008; Paus, Keshavan, and Giedd 2008). Given the early average onset of most psychiatric disorders, many disorders found among adults actually reflect recurrent or chronic disorders and, therefore, reflect much earlier epidemiological processes. Indeed, this is perhaps especially true among former inmates, as some of the most common psychiatric disorders found among inmates have unusually early onsets. For example, most impulse control disorders, characterized by a predisposition toward swift action in pursuit of gratification with little regard for long-term negative consequences (Moeller et al. 2001), begin in childhood (Kessler and Wang 2008). Findings of this sort are consistent with Gottfredson and Hirschi's (1990) general theory of crime, which locates the root cause of criminality in the failure to develop self-control early in life, leading to numerous subsequent problems, including criminal behavior and psychiatric disorders. Of course, not all criminal behavior reflects a psychiatric disorder and not all inmates are mentally ill. Nevertheless, these epidemiological patterns suggest that those with a history of incarceration may have distinct psychiatric patterns regarding age of onset and chronicity and, furthermore, these patterns suggest that incarceration itself exerts little causal influence.

A related complication stems from patterns of comorbidity between substance-specific disorders and other psychiatric disorders. An important finding of contemporary descriptive epidemiology is that many commonly occurring disorders are comorbid with others (Kessler and

Wang 2008) and an especially common pairing is between substance disorders and mood/anxiety disorders (Kessler, Chiu, Demler, and Walters 2005). This pattern has wide-ranging implications for understanding the epidemiology of psychiatric conditions, but it has some specific implications for those interested in the effects of incarceration. Because many crimes either reflect the behavioral disinhibition associated with drug/alcohol use or are a direct reflection of possessing controlled substances (Felson 1994), the prevalence of some disorders among current/former inmates might simply reflect the co-occurrence of these disorders with directly criminalized conditions and behaviors (Abram and Teplin 1991). Along these lines, Swartz and Lurigio (2007) find that the relationship between arrest and serious mental illness can be explained either entirely or substantially by substance use, depending on the offense. Early-onset substance abuse is related to the subsequent onset of a variety of other disorders, as well as delinquency and criminal behavior (Ellickson, Tucker, and Klein 2003; McCarty et al. 2004). For this reason, it is important to consider early-onset substance use disorders even when considering the effects of incarceration on other disorders, as substance-use disorders could play a direct role in both incarceration and those disorders.

Although none of the influences depicted on the left-side of Figure 1 suggests that the relationship between incarceration and psychiatric disorders is entirely spurious, they do suggest that those interested in identifying the influence of incarceration must control for a variety of risk factors anterior to incarceration and adult psychiatric conditions. It is also clear that researchers must consider a variety of outcomes. A distinct feature of the sociological approach to mental health is to consider effects across a range of outcomes and, thus, seriously consider

whether the effects of stress are disorder specific or general, as is usually anticipated in stress research (Aneshensel, Rutter, and Lachenbruch 1991). This feature is especially important in the case of incarceration as the outcomes potentially affected by incarceration vary greatly in terms of age of onset, with many disorders having an average onset well prior to adulthood, and in terms of their relationships with crime and criminality, with some disorders criminalized directly (e.g., drug abuse) or related to criminal behavior (e.g., alcohol abuse). Beyond these issues of the antecedents of psychiatric disorders, the rightmost side of Figure 1 suggests that researchers should also consider the consequences of psychiatric disorders for other outcomes, including reintegration.

Psychiatric Disorders and the Difficulties of Reintegration

Current research on incarceration tends to focus on its social and economic consequences, rather than its consequences for health (Pager 2008; Wakefield and Uggen 2010; Western 2007). However the two areas are not unrelated and, indeed, it is possible that incarceration's psychological effects shape incarceration's social consequences, even if most research fails to make the connection explicit. A good deal of evidence points to the difficulties of reintegration, whether in terms of employment, family, or community. Former inmates are, for example, less likely to be employed and earn less money when they are working (Pager 2003; Western 2002). They are also less likely to be married and have a difficult time sustaining relationships through a period of incarceration and after (Western and Wildeman 2009). These difficulties are usually interpreted in terms of human capital or stigma, as when former inmates are not hired because of their interrupted work histories, when state laws regulate their eligibility

for certain occupations, or when employers engage in outright discrimination. These influences are demonstrably important, but a number of scholars argue that mental health problems pose another important and neglected barrier to reintegration (Mallik-Kane and Visher 2008; Pogorzelski, Wolff, Pan, and Blitz 2005), citing the strong relationship between psychiatric disorders and disability in social, economic, and cognitive domains (Merikangas et al. 2007; Ormel et al. 1994). Psychiatric disorders affect disability by impairing higher-order capacities involved in virtually all daily activities (Ormel et al. 1994) and, for this reason, the effects of psychiatric disorders on disability may exceed those of physical disorders (Merikangas et al. 2007). Here, too, it is important to consider the specificity of incarceration's effects. Of the different disorders potentially experienced by former inmates, substance abuse may play a particularly strong role, but other conditions could contribute as well, including mood and anxiety disorders, given their unusually strong effects on disability (Merikangas et al. 2007). As before, it is important to consider what specific disorders incarceration may be related to when considering whether psychiatric disorders explain some part of the relationship between incarceration and disability.

Summary and Data Requirements

This study has three interrelated goals: (i) to understand the effects of incarceration in a life-course framework sensitive to the many forces that affect incarceration and psychiatric disorders simultaneously; (ii) to consider the role of psychiatric disorders in inhibiting reintegration by exploring the effects of incarceration and disorders on disability; and, in the context of both of these goals, (iii) to consider multiple and varied psychiatric outcomes

simultaneously, thereby delimiting in a precise fashion the range of incarceration's potential psychological effects.

The National Comorbidity Survey Replication

The National Comorbidity Survey Replication (NCS-R) is a nationally-representative survey and the benchmark source for current information on psychiatric disorders in the United States. It was carried out between 2001 and 2003 within the coterminous states among respondents age 18 and older (Alegria, Jackson, Kessler, and Takeuchi 2008; Kessler et al. 2006; Kessler and Merikangas 2004). The NCS-R was administered face-to-face using computer-assisted personal interview methods, which mitigates some of the difficulties of administering an unusually long and complex instrument containing numerous questions about potentially sensitive topics. The overall sample size was 9,282 and the response rate was over 70 percent. The primary purpose of the NCS-R was to assess change in the prevalence and correlates of psychiatric disorders. To this end, it followed the original NCS, which was administered in the early 1990s, and repeated many of the original questions, updated to reflect changes in psychiatric nomenclature (Kessler and Merikangas 2004).

The instrument used in the NCS-R was divided into two parts, each reflecting a different goal. Part I was administered to all respondents (N=9,282) and contained questions about the core disorders included in the World Mental Health Initiative Version of the Composite International Diagnostic Instrument (WMH-CIDI), discussed in more detail below. Part II contained information on risk factors and other correlates of psychiatric disorders, as well as

questions about disorders that were not of primary interest or were difficult to assess and, therefore, not included in Part I. Given the number of questions required to assess even the common disorders evaluated in Part I, Part II was not administered to all respondents. It was, instead, administered to respondents revealed in Part I to have psychiatric disorders or significant symptoms (i.e., those who met the criteria for a lifetime disorder; who met subthreshold criteria and received some kind of treatment; or who had made a plan to commit suicide) and a probability subsample of other respondents (N=5,692). Because our study is concerned with some key variables contained only in Part II, we limit the analysis to Part II respondents, adjusting for survey design, non-response, and sample selection using Part II-specific sampling weights.

Part II contains the core demographic control variables used in our study, as well as the disability assessment. Our primary variable of interest is, of course, incarceration. Respondents were asked whether they ever spent time in prison, jail, or a correctional facility since the age of 18. Our models include a dichotomous indicator: whether or not the respondent was ever incarcerated. Approximately 14 percent of respondents reported having been in prison/jail in their lifetime, but because of an unusual skip pattern, not all eligible respondents were asked this question. Respondents who reported that their religious beliefs were "not at all important" in their daily life were not asked additional about questions about their religiosity, but, more important for our purposes, they were also not asked questions about incarceration (among other background questions not used here). This skip pattern is unusual and unfortunate, but it has little apparent consequence for our specific research questions and the few missing cases it

introduces can be recaptured using an increasingly popular and well-established modeling procedure. First, very few respondents reported that religion was not at all important in their lives (less than 8 percent), meaning few cases are actually missing because of the skip pattern. Second, the response category adjacent to "not at all important" is quite similar in denotation ("not very important"), allowing us to test whether the effects of incarceration on psychiatric disorders varied between the meaningfully different levels of religiosity that were observed among those reporting any incarceration (in this case spanning "not very important" and "very important"). Interactions of this sort could reveal that the average effects estimated in our sample diverge from those we might find in a more demonstrably representative sample, but these interactions were almost entirely insignificant with no more significant interactions than expected by chance (8 percent) and, even among these few significant interactions, only half revealed linear patterns vis-à-vis adjacent categories, suggesting random variation.

Although there were few missing cases in general, all the results presented in the paper were derived from multiply-imputed data. Multiple imputation is a multiple-step process wherein missing values are predicted using a statistical model based on all the observed covariates, after which data sets are generated using expected values generated from the model while accounting for sampling variability by imputing over multiple data sets (Allison 2001; Little and Rubin 2002). From this it is possible to estimate models using each of the data sets and then use combination rules to merge these separate models into a single set of results (Rubin 1987). Imputing in this fashion over twenty data sets, we recapture a complete set of 5,692 cases rather than 5,204. To assure the robustness of our results, we also, produced results using listwise

deletion (tables available on request). There were no significant differences between the imputed data and listwise deletion data either in terms of summary statistics or regression results—indeed, in many cases, the prevalence was identical to the digit—with one notable exception. Using multiply imputed data increased the lifetime prevalence of alcohol abuse among those with a history of incarceration to 47.1% from 16%. Despite this increase, the multiply imputed regression models using alcohol abuse remained very similar to the listwise deletion regression models.

World Mental Health Version of the Composite International Diagnostic Interview

The primary diagnostic interview schedule used in the NCS-R was the World Mental Health Version of the Composite International Diagnostic Interview (WMH-CIDI) (Kessler and Ustun 2004). The WMH-CIDI is a fully-structured diagnostic interview that generates diagnoses consistent with the criteria contained in, for our study, the Diagnostic and Statistical Manual of American Psychiatric Association version 4 (DSM-IV). The WMH-CIDI generates both lifetime and 12-month diagnoses, the former indicating those who experienced a given disorder at any period in the their lifetime and the latter indicating those who experienced a lifetime disorder and had significant symptoms consistent with the disorder in the preceding 12 months. The WMH-CIDI is intended for lay administration, meaning that those who meet the criteria for a disorder need not have been diagnosed by a clinician. Despite this, clinical reappraisal studies reveal that the WMH-CIDI shows reasonably good concordance with structured clinical interviews (Kessler, Chiu, Demler, and Walters 2005). Moreover, at least some of the discordance between the two likely reflects the unreliability of clinical interviews, rather than the unreliability

of the WMH-CIDI. Lay interviews are perhaps even more essential for our study than for many other applications. First, by using a fully-structured interview format, the WMH-CIDI avoids potential contamination between diagnostic decisions and a clinician's knowledge of a person's imprisonment, which can lead to a significant clinical bias (Rhodes 2000; Rhodes 2002). Second, the fully-structured interview format avoids contamination between diagnoses and self-reported treatments. Many former inmates may be reluctant to seek services for fear of appearing "weak," leading to an especially strong disjuncture between diagnoses based on self-reports or treatment seeking and disorders derived only from clinical criteria (Mallik-Kane and Visher 2008).

There are other particular benefits to the NCS-R, notably an expanded set of diagnoses. Unlike the earlier NCS, the NCS-R assesses child and adolescent disorders, as well as assorted impulse-control disorders that are closely correlated with criminal behavior (Kessler and Merikangas 2004). In addition, compared with earlier diagnostic criteria, the DSM-IV is diagnostically conservative: it places greater emphasis on clinically significant distress and impairment, meaning that studies employing its criteria rather than those of earlier editions generally find lower prevalences. A final feature of the WMH-CIDI deserves comment. Below we use information on the reported age of onset, which is essential to modeling social selection. Given the uncertainty of most psychiatric symptoms, it is difficult to recall precisely when a disorder began, but the NCS-R made a special effort to increase the accuracy of respondent recall and, indeed, found improvements over previous instruments (Knäuper et al. 1999).

Childhood Adversities

The NCS-R assessed a variety of childhood adversities occurring before age 18, divided into four types based on prior analyses (Green et al. 2010). Most of these items are premised on an instrument created for the original NCS (Kessler, Davis, and Kendler 1997). *Parental maladjustment* is the sum of four indicators: mental illness, substance abuse, criminality (whether either parent engaged in criminal behavior or was arrested), or violence. *Interpersonal loss* is the sum of three indicators: parental death, divorce, or other separation from parents or caregivers. *Abuse or neglect* is the sum of three indicators: physical abuse, sexual abuse, and neglect. And *economic adversity* is whether the respondent's family ever received welfare. These items were culled from a variety of sources, including the first wave of the NCS (Kessler, Davis, and Kendler 1997) and related surveys (Courtney, Piliavin, Grogan-Kaylor, and Nesmith 1998), the Family History Research Diagnostic Criteria Interview (Endicott, Andreasen, and Spitzer 1978; Kendler et al. 1991), and the Conflict Tactics Scales (Straus 1979).

World Health Organization Disability Assessment Schedule

Part II respondents were also administered the World Health Organization Disability Assessment Schedule (WHO-DAS) (Rehm et al. 1999). The WHO-DAS was designed to measure functional impairments within the last 30 days across six dimensions derived from the WHO's International Classification of Impairment, Disabilities, and Handicaps. The domains and their questions are: (i) *role loss*, defined as the number of days in which the respondent was unable to complete normal activities; (ii) *self-care limitations*, defined as the number of days in which they had difficulty with washing, getting dressed, and staying alone; (iii) *mobility limitations*, defined as the number of days they had difficulty standing for 30 minutes, moving

inside the house, and walking a long distance; (iv) *cognition*, defined as the number of days they had difficulty concentrating for 10 minutes, understanding what was going on, remembering to do important things, and learning a new task; (v) *social functioning*, defined as the number of days they had difficulty getting alone with others, maintaining a conversation, dealing with people they did not know, maintaining friendships, making new friends, and controlling emotions around other people; and, (vi) *social participation*, defined as the amount of embarrassment and discrimination due to health problems. Per convention, each of the domains was scaled to a theoretical range of zero to 100, with zero indicating no disability and 100 indicating complete disability within the domain.

The WHO-DAS is concerned with health-related disability as a matter of focus, but it uses an expansive approach. For example, "health" includes mental and physical disorders. In addition, the WHO-DAS is a "global" or "external" measure of disability, rather than a "specific" or "internal" measure, in that it asks about general health-related disability regardless of the specific source. Although internal evaluations are useful and can speak readily to the relative contributions of different disorders—a topic we are interested in for theoretical reasons—internal evaluations require the respondent to report the amount of disability directly attributable to a single disorder. This is difficult for a number of reasons, not least of which is the high degree of comorbidity among different disorders and the difficulty of determining cause and effect amidst overlapping biological processes. Given this, we will identify the relative contributions of different disorders inferentially, estimating regression models that attempt to distill the specific sources of disability while controlling for all others. Making accurate inferences

about the relative contributions of psychiatric disorders necessitates measuring other health conditions, including chronic physical conditions that are comorbid with psychiatric disorders and entail significant disability. The chronic conditions checklist included in the NCS-R was adapted from the list used in the National Health Interview Survey. Most of the items in this list reference whether a physician diagnosed the condition (e.g., has a doctor ever diagnosed you with hypertension) and, for this reason, the checklist will underestimate conditions that are not brought to the attention of a professional. But the NCS-R also contains questions about symptoms that are impairing but not well-matched with a disorder, such as unexplained chronic pain. In the disability models, we include the sum of eight chronic conditions shown to be related to disability: arthritis, back pain, head ache, chronic pain, stroke, asthma, chronic obstructed pulmonary disease, and epilepsy.

Analytic Map and Empirical Considerations

In what follows, we explore the relationship between incarceration and psychiatric disorders over six tables, each of which builds on those preceding it. Table 1 begins with simple prevalence estimates, presenting the prevalence of lifetime and 12-month disorders for those with and without a history of incarceration, allowing us to assess whether there is a positive association between incarceration and psychiatric disorders. We use both lifetime and 12-month disorders, although 12-month disorders provide a better test of the long-term effects of lifetime incarceration than lifetime disorders and, thus, are the focus of some of our later analyses. Table 2 considers the characteristics of psychiatric disorders in greater detail, assessing whether those with a history of incarceration have earlier onset disorders, implying longer standing disorders,

and whether those with a history of incarceration have more chronic disorders, implying more severe cases. We present the average age of onset for each disorder, as well as the fraction of 12-month cases to lifetime cases, an indicator of the persistence of each disorder (a perfectly persistent disorder will yield a ratio of one, whereas a perfectly remitting disorder will, over a sufficient long period of time, yield a ratio of zero). Again we present these figures for those with and without a history of incarceration and present statistical tests of the difference.

The remaining tables attempt to discern the effects of incarceration and consequences of psychiatric disorders for disability. Table 3 presents basic descriptive statistics of the elements depicted on the left-side of Figure 1, childhood adversity and early onset substance abuse. Tables 4 and 5 combine the preceding tables in a multivariate regression context, exploring the effects of incarceration on lifetime (Table 4) and 12-month (Table 5) psychiatric disorders. Each table presents four models. In Model 1 we estimate the relationship between incarceration and psychiatric disorders including only demographic control variables either plausibly anterior to the process (i.e., education) or additively unrelated to causal considerations (i.e., race/ethnicity, age, and sex) (although we do test for interactions and discuss these briefly). In Model 2, we add childhood background and in Model 3 we add early-onset substance disorders. In the final model, we adjust for the early onset of the disorder under consideration, either by dropping cases whose onset was prior to age 18 (in the case of lifetime disorders) or simply controlling for under 18 onset (in the case of 12-month disorders). Table 6 explores whether psychiatric disorders

mediate the association between incarceration and disability.[1] We do so in three models, the second adjusting for education and the third including counts of assorted disorder types, along with a count of other chronic physical conditions. The second model allows us to compare the role of psychiatric disorders with that of education, whose relationship with disability and incarceration is more established.

Heterogeneity in the Effects of Incarceration

The tables focus on average effects for the entire sample, but a number of additional specifications were estimated. As noted, incarceration is more common among men than women and among African Americans than whites. In supplementary analyses, we estimated interactions between incarceration and race/ethnicity and incarceration and sex. Of the 90 possible interactions with race (three interactions, exhausting comparisons between four racial/ethnic groups), only 1 was significant, less than expected by chance (incarceration has more of a relationship with social phobia among "other" racial/ethnic groups). Similarly, of the

[1] Modeling disability presents particular challenges. To this point, the results will be presented in terms of specific disorders, but we move to a summary count measure when estimating the effects of disorders on disability. Specifically we model psychiatric disorders as counts within four specific DSM categories: anxiety disorders, mood disorders, impulse control disorders, and substance disorders. We do so for several reasons. First, modeling the influence of disorders using counts constrains the influence of each disorder to be equal, but it circumvents the contaminating influence of multicollinearity, which can be severe especially among disorders of the same type. Second, other studies exploring specific permutations of comorbidity reveal that comorbidity between disorders generally produces no greater disability than expected from a simple additive model of those disorders, meaning that a simple count is an empirically accurate way to account for the complexity of multiple disorders (Merikangas et al. 2007). To account for comorbidity with physical disorders, we also control for the number of chronic physical health problems, as described above. Most research suggests that models that fail to account for comorbidity among physical and psychological disorders risk overstating the effects of one or the other, even if the effects of psychiatric disorders are generally stronger than those of physical disorders.

30 possible interactions with sex, only 2 were significant, both suggesting a stronger negative effect for women than men (for lifetime intermittent explosive disorder and 12-month adult separation anxiety disorder). Although these insignificant interactions are inconsistent with the intuition of group differences in the stress of incarceration, they are not inconsistent with other health research, which also finds insignificant or inconsistently significant interactions (Schnittker and John 2007).

By the same token we focus on the effects being ever incarcerated, but incarceration varies greatly in its length. The mean for the NCS-R is 162 days, but the median is just under a week. In supplementary models we explored the relationship between length of incarceration and psychiatric disorders using semi-parametric methods, ultimately focusing on those disorders for which we found the strongest effects (discussed shortly). Like other studies, these models revealed that the length of a sentence was largely unrelated to psychiatric outcomes beyond the difference between those with and without a history of incarceration (Massoglia 2008; Schnittker and John 2007). If anything, the effect of sentence length was non-linear, such that it increased slowly up to 2 to 3 years, but declined thereafter. In this light, modeling the effects of incarceration as a dummy-variable is appropriate, but it is important to remember the relatively small sample of those with unusually long sentences and, further, the great heterogeneity among those with sentences of less than a year. Some respondents with less than a year of a total time reflect those doing multiple short sentences, some one long sentence, some in local facilities, and some in state facilities. The conditions of incarceration are almost certainly related to

incarceration's effects, but these conditions are only imperfectly correlated with the duration of a sentence.

Results

Table 1 reveals pervasive differences in the prevalence of psychiatric disorders between those with and without a history of incarceration, both in terms of lifetime and 12-month disorders. The largest differentials are found with respect to substance use disorders. Not surprisingly, as many as 29 percent of former inmates have met the criteria for drug abuse during their lifetime and nearly half of those with a history of incarceration abused alcohol. Yet the prevalence of psychiatric disorders is elevated across the full spectrum of disorders: former inmates are more likely to experience anxiety disorders, mood disorders, and impulse control disorders. Former inmates also have a higher prevalence of current disorders. In the case of 12-month disorders, the most common disorders are phobias. In addition, major depressive disorder is more common than either alcohol dependence, drug abuse, or drug dependence, despite the link between the latter and crime. All three mood disorders are more common than either oppositional defiant disorder or conduct disorder. Table 1 provides preliminary evidence that directly criminalized conditions are not the only relevant disorders when considering former inmates.

—Insert Table 1 About Here—

Table 2 provides the first bridge to a more rigorous analysis. Although the prevalence of psychiatric disorders may be higher among former inmates, other characteristics of psychiatric

disorders are not consistently different. Table 2 explores the average age of onset for each of the disorders, along with persistence. For our purposes, this table is relevant for at least three reasons: it explores whether the disorders described in Table 1 emerge before adult incarceration, whether the age of onset is earlier for those with a history of incarceration, and whether psychiatric disorders are more persistent among former inmates, which we might expect if the disorders found among former inmates are qualitatively different from those found among others. For five of the eighteen disorders, former inmates have first-onsets at significantly younger ages, as expected by those who emphasize the relationship between childhood disadvantage and early onset. Yet for most disorders there is no difference between formers inmates and others, and the few significant differences occasionally are in the opposite direction. For drug dependence, for example, former inmates have a significantly later onset. As has been established elsewhere, mood disorders generally have the latest onset, for former inmates and others alike. The persistence of psychiatric disorders is also, in general, not different between former inmates and others. Former inmates have significantly more persistent cases of agoraphobia and intermittent explosive disorder, as indicated by a higher percent of 12-month cases to lifetime cases. But none of the remaining differences are significant and, in the case of all four substance disorders, former inmates actually have slightly *less* persistent cases, as might be the case if former inmates are required, for example, to undergo drug treatment. In general, Table 2 reveals only a few differences that are, in themselves, insufficient to suggest that the psychiatric disorders experienced by former inmates are of a qualitatively different sort from those experienced by those without a history of incarceration.

—Insert Table 2 About Here—

The origins of their disorders may, however, be distinct. Table 3 presents summary statistics for the childhood background control variables and reveals pervasive differences. Former inmates are more likely to experience interpersonal loss, family maladaption, economic adversity, and abuse or neglect. They are also much more likely to experience early onset drug or alcohol abuse, with 15% of former inmates abusing alcohol before the age of 18 and 11% abusing drugs. These risk factors may explain some and perhaps all of the association between adult incarceration and adult psychiatric disorders, which we explore in Tables 4 and 5.

—Insert Table 3 About Here—

In both Tables 4 and 5, we consider only those conditions for which adult onset is diagnostically possible, which eliminates three of the four impulse control disorders discussed earlier, but we reconsider these disorders when discussing disability, as they could explain some of the disability former inmates experience even if they are not a consequence of incarceration. We also do not consider substance disorders to a great extent, given their status in most of our models as control variables. Table 4 begins with lifetime disorders and Table 5 continues with 12-month disorders. The models are presented in rows, rather than the conventional columns, but proceed left to right through progressively more stringent specifications, as discussed above. Within the rows the coefficients correspond to the incarceration coefficient from each logit model.

—Insert Tables 4 and 5 About Here—

Although they use different outcomes, tables 4 and 5 yield similar conclusions. First, the relationship between incarceration and psychiatric disorders is highly sensitive to control variables. Not all the control variables are equal in their relevance. For all the psychiatric disorders and for both lifetime and 12-month disorders the percentage reduction in the coefficients is greater between models 1 and 2 than between 2 and 3, meaning childhood background plays a more important role than early onset substance abuse in shaping the relationship between incarceration and psychiatric disorders. The influence of childhood background is remarkably consistent across disorders, accounting for 26% of the coefficient in Model 1 for lifetime disorders and 28% of the coefficient for 12-month disorders. Proceeding to the final model, which includes all the control variables, most of the association between incarceration and psychiatric disorders remains, but considering consistency between both tables 4 and 5, the relationship between incarceration and mood disorders remains surprisingly robust. Incarceration more than doubles the odds of current dysthymia and increases the odds of major depression by nearly 50%. There are also assorted relationships between incarceration and certain anxiety disorders—notably, for example, post-traumatic stress disorder—but none of the relationships that is significant for lifetime disorders is also significant for 12-month disorders and vice versa. In sum, the evidence for an effect of incarceration on most psychiatric disorders is weak, but we cannot rule out effects on mood disorders and these effects, although specific, are generally strong.[2]

[2] The models present average effects for all former inmates implicitly weighted by the prevalence of incarceration, but the demographic composition of prisons is unusual and the average effect may mask meaningful heterogeneity. In supplementary models we tested interactions between

Table 6 reveals these effects are also consequential. The table presents three models for each of the six forms of disability evaluated in the WHO-DAS. The first model presents the relationship between incarceration and disability with basic controls; the second model adds education in order to evaluate the explanatory power of a popular human capital indicator strongly related to incarceration, as discussed above; and the third model adds psychiatric disorders and chronic physical conditions. The results reveal, first, that former inmates suffer from a great deal of disability, manifest across multiple dimensions. The relationship between incarceration and disability is significant in all six cases, and in four of the cases the difference between those with and without a history of incarceration exceeds the difference between those with 16 or more years of education and those without a high school diploma. The table also reveals, however, that the problems inmates experience after release do not stem from human capital deficits alone (or even primarily). The difference between models 2 and 3 reveals that mental and physical health problems explain anywhere from 32 percent (mobility disability) to 88 percent (cognitive disability) of the relationship between incarceration and disability. Notably in the case of self-care and cognitive disability, the association between incarceration and disability is explained entirely in Model 3. Perhaps even more important, a large fraction of this mediation stems from mood disorders specifically. Across the six different types of disability, the

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race and incarceration and sex and incarceration, seeing in particular if over-represented groups (e.g., African Americans, men) differed significantly from under-represented ones (e.g., whites, women) (interactions were added to the model with age-of-onset controls). The vast majority of these coefficients were insignificant, including all the race interactions. In the case of sex, seven interactions were significant and positive, but most of the interactions were for lifetime disorders (i.e., agoraphobia, post-traumatic stress disorder, adult separation anxiety, dysthymia, and bipolar disorder). None of the 12-month mood disorder interactions was significant.

consequences of mood disorders exceed those of conditions tightly associated with incarceration by virtue of criminalization, including impulse control disorders and substance disorders, which matter very little. Of the twelve coefficients associated with the latter two types of disorder, only one is significant and, furthermore, with the exception of mobility disability, mood disorders play a more important role than chronic physical health conditions. Mood disorders are particularly important in explaining social interaction and social participation disabilities, which are important in their own right be especially because of their relationship with the success of prisoner reintegration.

—Insert Table 6 About Here—

Discussion

A long-standing line of sociological research is concerned with the enduring effects of total institutions on mental health and life chances, but we know surprisingly little about the mental health of former inmates (although we know a little about the mental health of current inmates) and very little research has attempted to deal with the many potential threats to a causal claim, including the criminalization of many psychiatric disorders and the origins of both criminal behavior and psychiatric disorders in childhood adversities. The literatures on total institutions, prisoner reintegration, the life-course dimensions of offending, and the sociology of mental health remain largely segregated, even though there is considerable overlap in their themes.

The results of this study suggest that effects of incarceration are both more and less than anticipated. Although former inmates have higher rates of psychiatric disorder for virtually all common disorders, in most instances the association does not reflect an effect of incarceration. Precisely because of the overlap between childhood conditions and both offending and psychiatric disorders, the relationship between incarceration and many psychiatric disorders is highly sensitive to childhood background factors and, to a lesser degree, early-onset substance abuse. In this way, our results highlight the considerable overlap between the life-course determinants of crime and the life-course determinants of psychiatric outcomes: both are a reflection of childhood adversities. Incarceration does, however, have robust effects on mood disorders and, for this class of disorders, the effects are quite strong. Incarceration increases the odds of lifetime major depression—the most common psychiatric disorder in the general population (Kessler et al. 2005)—by 33 percent. The effects on 12-month dysthymia are even stronger, where incarceration more than doubles the odds. Although the relationship between incarceration and 12-month bipolar disorder is not significant at conventional levels, the coefficient from the most rigorous specification (Model 4) is in fact larger than the significant coefficient found in a less rigorous specification (Model 3). It is possible that a larger sample would produce more consistent findings, and in this vein it is notable that many of the incarceration coefficients for anxiety disorders are quite large, even if statistically insignificant. Nevertheless, our empirical confidence is limited to mood disorders, and even if the effects of incarceration are limited in this fashion, they are no less important for being particular.

Mood disorders are strongly related to disability and play an important role in explaining some the difficulties former inmates experience after release relative to those without a history of incarceration. Indeed, our results suggest that different between former inmates and others in disability could be reduced greatly or, in two cases, eliminated entirely by addressing psychiatric disorders. The mediation of the incarceration coefficient is driven primarily by mood disorders, whose relationship with disability exceeds that of almost all the other condition categories, whether mental or physical. This set of findings is important for several reasons. For one, it suggests that our intuitions regarding what matters for selection into prison are not a particularly good guide for our predictions regarding what is most consequential following release (see also Uggen and Piliavin 1998 on asymmetric causation). Although substance disorders and impulse-control disorders are among the most common disorders found among former inmates and have direct relevance to criminal behavior, they are not the most relevant for understanding disability and, by extension, reintegration. This asymmetric causation illustrates one specific way in which the segregation of the literatures related to the topic of incarceration and mental health may come at a cost: focusing only on childhood disadvantage or social selection or reintegration may miss how processes are related. By the same token, only by considering multiple psychiatric outcomes is it possible to discern what might be a consequence of incarceration and what might be a determinant, a point that may be missed by those focusing on "mental health" in general.

This finding is also relevant to social policy, especially to those responsible for providing services to returning inmates. But here, too, the findings introduce questions regarding whether existing theoretical frameworks are appropriate for formulating programs. Along these lines,

there have been some efforts among service providers to more closely align the criminal justice system with the public health system, with some arguing that by protecting the health and well-being of former inmates we can also protect the health and safety of the community at large (Freudenberg et al. 2008; Golembeski and Fullilove 2005). One implication of our study is that such programs may also serve to promote reintegration, but mood disorders—the focus of our claims—do not fit comfortably into existing criminal-justice-as-public-health frameworks. Mood disorders are not directly criminalized, like substance abuse disorders, nor are they infectious, like HIV/AIDS or tuberculosis. For these reasons, mood disorders may fall through the cracks of even the most broad and progressive frameworks: they may be seen as less relevant to the experience of former inmates or less amenable to treatment and, thus, not be a typical part of needs assessment. Our results suggest, to the contrary, that they should be an important element of service delivery because they have direct implications for reintegration and, thus, might even be considered an important element in parole.

The results also point to areas of mutual interest between those concerned with the health consequences of incarceration and those interested in finding mechanisms to ameliorate incarceration's pervasive negative effects. Although stigma and discrimination play a demonstrable role in employment and marriage among former inmates, psychiatric disorders are also relevant to these outcomes but they are generally not part of the debate. They are important in a number of respects. For one, it is possible that stigma and mental illness work hand-in-hand in the sense that the stigma of incarceration overlaps with the stigma of mental illness. For example, employers may be reluctant to hire former inmates because they perceive them to be

mentally ill, much as employers are reluctant to hire former mental patients because they are perceived to be dangerous (Link and Phelan 2001). Mood disorders may also be significant in their own right, regardless of stigma, meaning that even if discrimination against former inmates were reduced or eliminated, former inmates would continue to suffer because of their mood disorders. Indeed, because of their strong effects on disability related to functioning and cognition, mood disorders provide scholars with a mechanism for explaining the self-defeating behavior of former inmates, a task for which discrimination alone is likely ill-suited. For example, there may be something to the claim that former inmates are discriminated against in part because they are believed to be poor employees (Pager, Western, and Bonikowski 2009), but insofar as this is true at all, the diminished skills of former inmates may have more to do with their poor mental health than with diminished motivation, intelligence, or organization. By recognizing the consequences of mood disorders, it is possible to develop a more robust appreciation of former inmates' behavior and recognize some of its structural determinants.

Although our analysis focuses on the unique effects of incarceration, it is important to note that the disorders experienced by former inmates do not appear to be much different from those experienced by others. It is true that psychiatric disorders among former inmates often begin in childhood and adolescence, but this is true for those without a history of incarceration as well (Paus, Keshavan, and Giedd 2008). Similarly, the effects of incarceration may be enduring in the sense that they are found for both current and lifetime disorders, but it is not the case that former inmates suffer from more persistent disorders. The ratio differences presented in Table 2 are significant in only 2 of 18 cases and, for those disorders more consistently linked to

incarceration across all the model specifications, none of the ratios is significant. Furthermore, the effects of incarceration on lifetime disorders are, in most cases, more powerful than those on 12-month disorders, implying that the negative effects of incarceration, such as they are, are not necessarily enduring and that many disorders among former inmates are self-limiting, much as they are in the population in general (Kessler and Wang 2008). In short, while psychiatric disorders are more prevalent among inmates than others, they may be just as amenable to treatment as they are among those without a history of incarceration.

Limitations

The strengths of this study stem from the NCS-R and how the survey allows the analyst to explore psychiatric disorders with breadth and precision, a benefit found in few nationally representative surveys, but the study's weaknesses reflect the flip side of the same coin. Although we observe many influences relevant to understanding the effects of incarceration, these influences are often measured with error. The age-of-onset controls, for example, involve respondent retrospection, which is of course imperfect, especially for disorders not often associated with a discernable event (e.g., a heart attack). Similarly, childhood adversities are based on retrospective reports and may be underestimated or correlated with current mental health (Kendler et al. 1991). Nonetheless, there are signs that our control variables do, indeed, capture the many of the influences we are concerned with. If selection were the preeminent force behind the observed relationship between incarceration and psychiatric disorders, the effects of incarceration would ceteris paribus be weaker for conditions with earlier onsets, but this pattern was not observed in our models. Anxiety disorders, for example, have an especially early onset,

but their relationship with incarceration is no more sensitive than that relationship between incarceration and other conditions. We also do not observe the age at which incarceration first occurs, except that it occurred in adulthood. Because criminal behavior declines with age, incarceration likely precedes most of the 12-month disorders we observe, but it will be important in future research to systematically discern the life-course sensitivity of the psychological effects of incarceration.

Measurement error is also possible with respect to the diagnoses themselves: it is possible that former inmates manifest psychiatric disorders in a fashion that does not cohere well with conventional diagnostic criteria. Something of the sort may be apparent in the unusually strong relationship between incarceration and dysthymia, especially relative to the relationship between incarceration and major depression. If prisonization involves the suppression of emotions that might convey weakness or vulnerability, former inmates might express their distress more through dysthymia, a milder form of sadness, rather than major depression. In this way, differences in the effects of incarceration could reflect meaningful taxometric asymmetries, but, if so, the causal effect of incarceration is diminished by a reporting bias, rendering our results conservative more than inaccurate. Furthermore, even if this sort of reporting differential is occurring, there is still a relationship between incarceration and major depression that is sufficiently strong to withstand a great many control variables.

Our results are conservative from other perspectives as well. If incarceration is the end of a long trail of contact with the criminal justice system, our controls for childhood background, age-of-onset, and early onset substance disorders may eliminate the stigmatizing effects of

contact with the criminal justice system. This is especially the case in instances where adult inmates are also incarcerated as juveniles and juvenile incarceration itself exerts some influence over adult psychiatric disorders. By the same token, incarceration history is based on self-reports. If individuals suppress their histories for fear of discrimination, some fraction of those with a history of incarceration will be incorrectly coded as not having a history, biasing the effects of incarceration downward.

A final limitation pertains to the meaning of incarceration itself. Apart from the measurement of incarceration and how adequately we have measured exposure, we are not able to explain the effects of incarceration and what incarceration actually reveals remains uncertain. Incarceration is the outcome of the commission of a crime (or, in short stays, the suspicion of the commission of one), but it reflects many other things besides, including, in most instances, the mark of a criminal record; exposure to the prison environment; and exposure to the stress of discrimination and reintegration after release. Although we have documented effects attributable to having been previously incarcerated and, thus, show some enduring impact, it is unclear whether these effects represent the lingering effect of the prison environment per se, the effects of a criminal record, the stress of reintegration, involvement with criminal behavior, involvement with the criminal justice system, or other sequelae of a criminal record. These many assorted mechanisms and processes may ultimately stem from prison and, thus, be considered effects of incarceration, but they imply different points of intervention and, therefore, deserve fine-grained attention. The data requirements of pursuing a more fine-grained process are, of course, very high, but we hope our study points to the value in doing so.

Conclusion

In closing it is worth noting that our emphasis on psychiatric disorders as an outcome of incarceration and a mechanism for explaining the poor reintegration has an ironic edge. A long tradition in sociological research casts psychiatric disorders as a means of labeling and, thereby, controlling deviant behavior—thus the well-known alignment of "madness" with "badness" (Conrad 1992). Although psychiatric labels provide a convenient nomenclature for certain forms of deviance, our results suggest that treating psychiatric disorders provides a potential strategy for reintegrating and, thereby, a strategy for normalizing former inmates (see also Pogorzelski, Wolff, Pan, and Blitz 2005). We encourage the development of new frameworks for understanding incarceration's impact and consequences. These frameworks should be sensitive to the different forces behind selection and those behind causation, as well as the distinction between what is legally criminalized and what is enduringly consequential.

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Table 1. Lifetime and 12-Month Prevalence of Psychiatric Disorders Among Those With and Without a History of Incarceration: NCS-R (N = 5,692)

	Lifetime Prevalence				*12-Month Prevalence*			
	No Incarceration		Incarceration		No Incarceration		Incarceration	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Anxiety Disorders								
Panic Disorder	4.4	(.3)	7.4*	(1.0)	2.5	(.2)	4.5*	(.8)
Agoraphobia	2.3	(.2)	3.4	(.7)	1.2	(.1)	2.7*	(.6)
Specific Phobia	12.2	(.5)	16.0*	(1.6)	8.4	(.5)	11.7*	(1.3)
Social Phobia	11.3	(.5)	18.6*	(1.5)	6.2	(.3)	11.5*	(1.2)
Generalized Anxiety Disorder	7.6	(.4)	9.3	(.9)	3.9	(.2)	5.3	(.8)
Post-Traumatic Stress Disorder	6.3	(.5)	10.8*	(1.5)	3.2	(.2)	6.3*	(1.4)
Adult Separation Anxiety	5.7	(.3)	13.2*	(1.6)	1.6	(.2)	4.0*	(.8)
Mood Disorders								
Major Depressive Disorder	16.1	(.6)	19.8*	(1.6)	6.4	(.3)	9.2*	(1.0)
Dysthymia	3.8	(.3)	5.9*	(.8)	2.0	(.2)	4.1*	(.7)
Bipolar Disorder	3.8	(.3)	8.5*	(1.0)	2.5	(.2)	5.8*	(.8)
Impulse Control Disorders								
Oppositional Defiant Disorder	4.5	(.5)	13.7*	(1.4)	.4	(.1)	2.4*	(.7)
Conduct Disorder	3.4	(.4)	18.3*	(2.3)	.3	(.1)	2.2*	(.8)
Attention Deficit Disorder	3.5	(.3)	10.8*	(1.2)	1.7	(.2)	5.9*	(1.2)
Intermittent Explosive Disorder	6.7	(.5)	15.7*	(1.6)	3.4	(.3)	10.3*	(1.7)
Substance Disorders								
Alcohol Abuse	8.4	(.7)	47.0*	(4.8)	1.9	(.2)	10.0*	(1.6)
Alcohol Dependence	3.1	(.3)	21.3*	(2.4)	.8	(.2)	5.2*	(1.1)
Drug Abuse	4.9	(.5)	29.2*	(3.1)	.8	(.1)	4.8*	(1.0)
Drug Dependence	1.7	(.2)	12.9*	(1.7)	.3	(.1)	1.5*	(.6)

* $p < .05$ (two-tailed test of mean difference between no incarceration and incarceration; standard errors are presented in parentheses)

Note: Models based on 20 multiple-imputation data sets, imputing 488 missing cases.

Table 2. Descriptive Epidemiology of Psychiatric Disorders Among Those With and Without a History of Incarceration: NCS-R (Total N = 5,692)

	Average Age of Onset				*Percent of 12-Month Cases To Lifetime Cases*			
	No Incarceration		Incarceration		No Incarceration		Incarceration	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Anxiety Disorders								
Panic Disorder	24.1	(.9)	20.4*	(1.3)	57.9	(2.9)	61.5	(5.8)
Agoraphobia	19.1	(1.0)	15.9	(1.7)	54.4	(4.3)	79.6*	(6.9)
Specific Phobia	8.4	(.3)	9.7	(.9)	69.1	(1.7)	73.3	(4.4)
Social Phobia	11.7	(.3)	11.4	(.5)	54.8	(1.9)	61.8	(4.2)
Generalized Anxiety Disorder	27.6	(.7)	23.6*	(1.2)	51.1	(2.2)	57.2	(5.3)
Post-Traumatic Stress Disorder	21.2	(.7)	20.8	(1.6)	50.6	(3.0)	58.7	(5.3)
Adult Separation Anxiety	22.5	(.7)	22.2	(1.1)	28.5	(2.8)	30.2	(4.5)
Mood Disorders								
Major Depressive Disorder	27.2	(.4)	24.6*	(1.2)	39.4	(1.5)	46.4	(4.2)
Dysthymia	26.4	(.9)	21.3*	(1.4)	54.5	(3.3)	68.9	(6.5)
Bipolar Disorder	23.4	(.8)	22.7	(1.4)	64.2	(3.1)	68.2	(5.3)
Impulse Control Disorders								
Oppositional Defiant Disorder	10.8	(.3)	10.0	(.4)	8.6	(1.7)	17.7	(4.3)
Conduct Disorder	11.4	(.3)	11.7	(.3)	9.0	(2.6)	12.0	(3.8)
Attention Deficit Disorder	6.6	(.2)	7.2	(.3)	47.9	(3.7)	54.6	(6.4)
Intermittent Explosive Disorder	14.5	(.4)	13.4	(.5)	51.0	(2.6)	65.7*	(4.6)
Substance Disorders								
Alcohol Abuse	22.6	(.5)	21.2*	(.4)	22.6	(2.1)	21.4	(2.5)
Alcohol Dependence	23.9	(.6)	22.9	(.6)	25.2	(3.5)	24.1	(3.9)
Drug Abuse	19.3	(.3)	20.0	(.4)	16.7	(2.5)	16.2	(2.5)
Drug Dependence	20.3	(.6)	22.6*	(.9)	15.9	(3.7)	11.6	(3.5)

* $p < .05$ (two-tailed test of mean difference between no incarceration and incarceration; standard errors are presented in parentheses)

Note: Models based on 20 multiple-imputation data sets, imputing 488 missing cases.

Table 3. Childhood Background and Incarceration: NCS-R (N=5,692)

	No Incarceration		Incarceration	
	Mean	S.E.	Mean	S.E.
Childhood Adversities				
Interpersonal Loss [0-1]	.30	(.01)	.42*	(.02)
Family Maladaptation [0-4]	.49	(.02)	.82*	(.05)
Economic Adversity [0-1]	.09	(.01)	.12*	(.02)
Abuse or Neglect [0-3]	.31	(.01)	.48*	(.03)
Early Onset Substance Abuse				
Alcohol Abuse [0-1]	.02	(.00)	.15*	(.02)
Drug Abuse [0-1]	.02	(.00)	.11*	(.01)

* $p < .05$ (two-tailed test of mean difference between no incarceration and incarceration; standard errors are presented in parentheses; variable ranges presented in brackets)
Note: Models based on 20 multiple-imputation data sets, imputing 488 missing cases.

Table 4. Any Incarceration Coefficients from Logit Regression Models of Lifetime Disorders with Controls: NCS-R (N=5,692)

	Model 1 Basic Controls		Model 2 Model 1 + Childhood Background		Model 3 Model 2 + Early-Onset Substance Abuse		Model 4 Model 3 + Eliminating those with Under 18 Onset of Primary Disorder	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Anxiety Disorders								
Panic Disorder	0.829**	(0.181)	0.574**	(0.176)	0.473**	(0.175)	0.559*	(0.208)
Agoraphobia	0.507	(0.286)	0.210	(0.290)	0.114	(0.272)	0.117	(0.394)
Specific Phobia	0.499**	(0.141)	0.288*	(0.136)	0.209	(0.137)	0.939	(0.483)
Social Phobia	0.651**	(0.121)	0.477**	(0.125)	0.405**	(0.123)	0.533	(0.288)
Generalized Anxiety	0.551**	(0.134)	0.276*	(0.131)	0.235	(0.130)	0.367	(0.200)
Posttraumatic Stress	1.004**	(0.211)	0.714**	(0.208)	0.610**	(0.206)	0.697*	(0.278)
Adult Separation Anxiety	0.917**	(0.163)	0.672**	(0.150)	0.600**	(0.147)	0.797**	(0.164)
Mood Disorders								
Major Depressive	0.500**	(0.113)	0.322**	(0.113)	0.288*	(0.112)	0.375*	(0.142)
Dysthymia	0.744**	(0.183)	0.390*	(0.185)	0.340	(0.186)	0.537*	(0.240)
Bipolar	0.738**	(0.149)	0.477**	(0.149)	0.321*	(0.137)	0.511*	(0.194)
Impulse Control Disorders								
Intermittent Explosive	0.653**	(0.144)	0.481**	(0.140)	0.371*	(0.138)	0.527	(0.270)
Substance Disorders								
Alcohol Abuse	2.029**	(0.218)	1.901**	(0.212)				
Alcohol Dependence	1.922**	(0.197)	1.750**	(0.191)				
Drug Abuse	1.862**	(0.203)	1.704**	(0.199)				
Drug Dependence	2.017**	(0.245)	1.794**	(0.244)				

* $p < .05$; ** $p < .01$ (two-tailed test; standard errors are in parentheses)

Note: The basic controls are education, race/ethnicity, age, and sex. Models based on 20 multiple-imputation data sets, imputing 488 missing cases.

Table 5. Any Incarceration Coefficients from Logit Regression Models of 12-Month Disorders with Controls: NCS-R (N=5,692)

	Model 1 Basic Controls		Model 2 Model 1 + Childhood Background		Model 3 Model 2 + Early-Onset Substance Abuse		Model 4 Model 3 + Controls for Under 18 Onset of Primary Disorder	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Anxiety Disorders								
Panic Disorder	0.855**	(0.232)	0.570*	(0.222)	0.464*	(0.225)	0.509	(0.259)
Agoraphobia	0.731*	(0.297)	0.491	(0.302)	0.414	(0.296)	0.592	(0.366)
Specific Phobia	0.568**	(0.143)	0.366**	(0.135)	0.311*	(0.136)	0.598**	(0.202)
Social Phobia	0.733**	(0.152)	0.539**	(0.147)	0.491**	(0.153)	0.324	(0.202)
Generalized Anxiety	0.568**	(0.174)	0.308	(0.175)	0.255	(0.176)	0.371	(0.240)
Posttraumatic Stress	1.141**	(0.298)	0.772*	(0.297)	0.631*	(0.296)	0.578	(0.380)
Adult Separation Anxiety	0.759**	(0.276)	0.540	(0.286)	0.47	(0.302)	0.504	(0.303)
Mood Disorders								
Major Depressive	0.597**	(0.148)	0.395**	(0.135)	0.383**	(0.141)	0.392*	(0.157)
Dysthymia	0.954**	(0.239)	0.657**	(0.212)	0.626**	(0.226)	0.748**	(0.264)
Bipolar	0.701**	(0.169)	0.480**	(0.170)	0.335*	(0.166)	0.484	(0.259)
Impulse Control Disorders								
Intermittent Explosive	0.915**	(0.198)	0.737**	(0.197)	0.628**	(0.204)	0.632*	(0.258)
Substance Disorders								
Alcohol Abuse	1.468**	(0.231)	1.304**	(0.240)				
Alcohol Dependence	1.709**	(0.339)	1.486**	(0.356)				
Drug Abuse	1.420**	(0.331)	1.224**	(0.338)				
Drug Dependence	1.549**	(0.492)	1.241*	(0.494)				

* $p < .05$; ** $p < .01$ (two-tailed test; standard errors are in parentheses)

Note: The basic controls are education, race/ethnicity, age, and sex. Models based on 20 multiple-imputation data sets, imputing 488 missing cases.

Table 6. Linear Regression Models of WHO-DAS Disability Scores: NCS-R (N=5,692)

	Self-Care			*Cognitive*			*Mobility*		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Any incarceration	0.550*	0.427	0.240	0.903**	0.566*	0.069	3.312**	2.827**	1.921*
	(0.258)	(0.278)	(0.266)	(0.277)	(0.233)	(0.202)	(0.940)	(0.934)	(0.893)
Education									
High School Diploma	-1.310**	-1.274*	-1.141*	-0.430*	-0.370	-0.095	-1.900	-1.771	-1.036
	(0.482)	(0.498)	(0.494)	(0.207)	(0.194)	(0.194)	(1.212)	(1.206)	(1.302)
13 to 15 Years	-1.298**	-1.276**	-1.124*	-0.316	-0.267	0.029	-2.407*	-2.322*	-1.472
	(0.452)	(0.458)	(0.455)	(0.239)	(0.231)	(0.194)	(1.000)	(1.011)	(1.071)
16 or More Years	-0.987	-0.952	-0.713	-0.679**	-0.565*	-0.104	-3.384**	-3.261**	-1.892
	(0.525)	(0.583)	(0.557)	(0.242)	(0.239)	(0.202)	(1.065)	(1.085)	(1.154)
Condition Counts									
Anxiety			0.441*			1.365**			1.393**
			(0.189)			(0.189)			(0.405)
Mood			0.845*			2.312**			2.650**
			(0.375)			(0.357)			(0.738)
Impulse			-0.438			0.276			-0.568
			(0.400)			(0.329)			(0.701)
Substance			-0.014			-0.167			-0.956*
			(0.211)			(0.260)			(0.431)
Chronic Physical			0.510**			0.640**			3.126**
Conditions			(0.159)			(0.073)			(0.225)

	Extent Out of Role			*Social Interaction*			*Social Participation*		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Any incarceration	8.499**	6.965**	4.262**	1.004**	0.801**	0.400	2.554**	1.918**	0.997*
	(1.698)	(1.628)	(1.355)	(0.282)	(0.264)	(0.209)	(0.642)	(0.588)	(0.446)
Education									
High School Diploma	-3.104	-2.489	-0.919	-0.027	0.028	0.213	-0.729*	-0.578	-0.093
	(2.034)	(2.008)	(2.074)	(0.196)	(0.198)	(0.197)	(0.349)	(0.339)	(0.327)
13 to 15 Years	-4.831**	-4.188*	-2.380	-0.054	-0.005	0.192	-0.778	-0.661	-0.127
	(1.609)	(1.553)	(1.535)	(0.207)	(0.203)	(0.179)	(0.397)	(0.400)	(0.339)
16 or More Years	-6.787**	-5.746**	-2.897	-0.067	0.023	0.323	-1.261**	-1.035**	-0.204
	(1.596)	(1.557)	(1.643)	(0.218)	(0.211)	(0.187)	(0.363)	(0.372)	(0.314)
Condition Counts									
Anxiety			4.152**			1.064**			2.018**
			(0.501)			(0.183)			(0.311)
Mood			7.784**			1.952**			3.819**
			(1.026)			(0.338)			(0.520)
Impulse			1.539			0.376			0.760
			(1.384)			(0.335)			(0.633)
Substance			1.598			0.147			0.234
			(1.144)			(0.231)			(0.958)
Chronic Physical			5.321**			0.286**			1.201**
Conditions			(0.424)			(0.063)			(0.123)

* $p < .05$; ** $p < .01$ (two-tailed test; standard errors are in parentheses)

Note: All models also include covariates for race/ethnicity, age, and sex. Models based on 20 multiple-imputation data sets, imputing 488 missing cases.

Figure 1. Conceptual Model Illustrating Influences in the Incarceration-Psychiatric Disorder Relationship