

Has Psychiatric Medication Reduced Crime and Delinquency?

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Abstract

Several strands of research are consistent with the possibility that expansions in psychiatric medication usage have reduced crime and delinquency. Estimates suggest that medication usage has increased to as much as 9% of the youth population and up to 20% of the adult population in the United States and is high among populations associated with the criminal justice system. Studies show that four classes of commonly used psychiatric medication do reduce aggressive behavior, and crime rates are lower among diagnosed patients receiving such medications compared to those not. Prescriptions for medication increased fivefold for youth during the time that crime has declined in the United States and elsewhere, and two population-level analyses find some association between prescription rates and crime trends over time. However, true experimental studies are lacking, and one of the better trend studies does not show strong associations. This article proposes a research agenda for this issue.

Keywords

assault, offending, drugs, prevention, psychotropics

Introduction

Large numbers of youth and adults now take psychiatric medications. A 2014 national youth survey, the National Survey of Children Exposed to Violence, found 9% of 12- to 17-year-olds ($N = 1,615$) were taking some kind of such medication (Finkelhor, Shattuck, Turner, & Hamby, 2015, data from the author). Another study estimated psychotropic usage at 20% of the adult population (Medco Health Solutions Inc., 2011).

Usage of these medications saw a marked acceleration beginning in the 1990s and has continued to date (Figure 1 and Table 1). From the early 1990s to 2010, psychiatric medication for youth grew fivefold (Jonas, Albertorio-Diaz, & Gu, 2012). Interestingly, around the same time of this acceleration, the crime rate began to fall in the United States and elsewhere (Truman, Langton, & Planty, 2013). From 1993 to 2002, violent crime measured by victim reports declined about 60%, and another 10% in the following decade. Property crime declined as well (Truman, Langton, & BJS Statisticians, 2014). Serious juvenile offending declined about 50% from 1995 to 2004 (Puzzanchera, 2013). The declines were seen for most kinds of crime in all regions of the United States and among victims and offenders of all races (Puzzanchera, 2013). Other indicators of aggression, violence, and risk-taking behavior also improved (Finkelhor & Jones, 2006). Physical and sexual abuse of children declined, as did youth suicides, and teen births, all with accelerations starting in the early 1990s. This poses the question of whether some of this amelioration could be ascribed to the new widespread use of these medicines.

In this article, we will review evidence on several issues related to this question. First, we will look at whether it is a reasonable hypothesis to expect that medication has effects that could result in declines in crime and related behaviors. Next, we will look at whether these medications are being prescribed to populations and under conditions that might be conducive to reducing crime and related behaviors. Third, we will examine whether the trends in medication prescription and crime have covaried in ways that suggest some population-level effects. Fourth, we will discuss some controversies about the usage of psychiatric medication that may complicate objective research on this issue. Finally, we will make suggestions for needed research on this topic. The literature review for this article was conducted by searching Ebscohost and Google Scholar with the terms “psychotropic medication,” “psychiatric medication,” “antidepressant medication,” “SSRI medication,” “stimulant medication,” “antipsychotic medication,” and these terms in conjunction with “violence,” “aggression,” “prevalence,” and “crime.”

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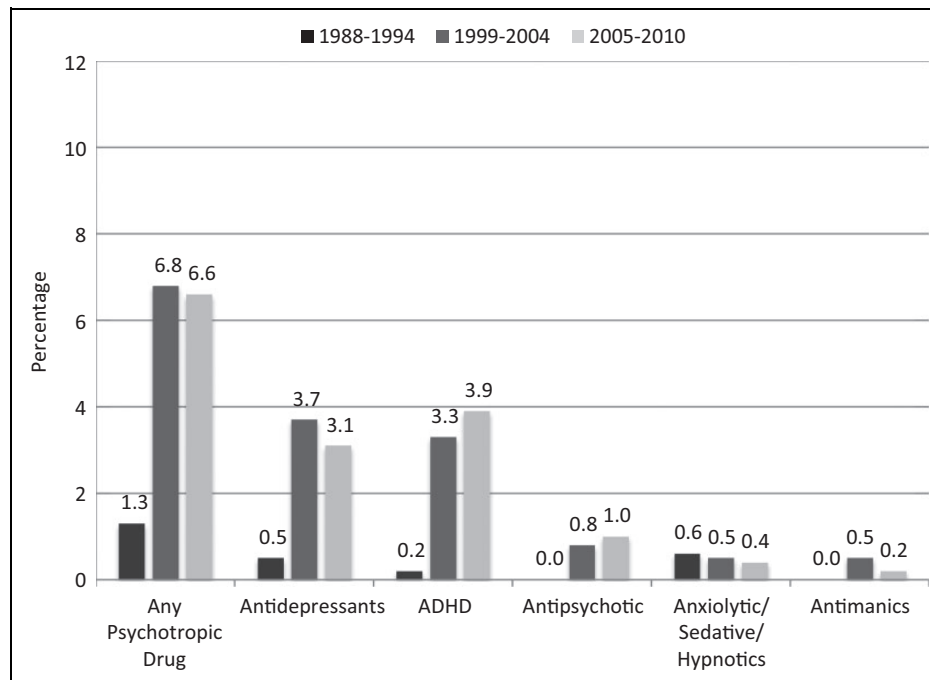


Figure 1. Prevalence of any psychotropic drug and selected psychotropic classes use in the past month among adolescents 12–17 years of age in the United States. Data are from the National Health and Nutrition Examination Survey (NHANES). Adapted from Jonas, Albertorio-Diaz, and Gu (2012).

Table 1. Trends in Office-Based Visits Resulting in Mental Disorder Diagnosis, Psychotropic Medication, Psychotherapy, and Psychiatric Care for Young People and Adults in the United States, 1995–2010.^a

Characteristic	No. of Visits per 100 Population (95% CI)			
	1995–1998	1999–2002	2003–2006	2007–2010
Any psychotropic medications				
Youth	8.35 [7.11, 9.58]	11.96 [9.75, 14.17]	14.49 [11.80, 17.18]	17.12 [13.59, 20.66]
Adults	30.76 [27.24, 34.28]	38.07 [32.42, 43.72]	49.29 [41.30, 57.28]	65.90 [54.57, 77.22]

Note. CI = confidence intervals. Adapted from Olfson, Blanco, Wang, Laje, and Correll (2014).

^aData are from the National Ambulatory Medical Care Survey. Youth are younger than 21 years of age, and adults are 21 years of age or older.

Types of Psychiatric Medication

The research on psychiatric medications tends to be broken down by type of medication, the most widely prescribed of which fall into five classes. (The term “medication” will be used hereafter to refer to psychiatric medication specifically.)

Antidepressants are medications that have proven effective at treating depression, anxiety, and, in some cases, substance abuse. They include drugs with brand names of Prozac, Zoloft, Paxil, Wellbutrin, and Effexor. Some of these act to increase the availability of neurotransmitter serotonin (selective serotonin reuptake inhibitor [SSRIs]) or serotonin and norepinephrine (serotonin and norepinephrine reuptake inhibitor [SNRIs]). These are the most frequent of the medications being taken by adults and among the most frequent being taken by youth (Table 1). Estimates are that antidepressants are now taken by 3.2% of the adolescent population (Jonas, Gu, &

Albertorio-Diaz, 2013). The increase has been large since the early 1990s (Figure 1 and Table 2), although some disagreement remains about whether the dissemination is continuing or has plateaued.

Stimulants are medications that have proven useful in the treatment of hyperactivity and attention problems in children and youth but also in adulthood. They include drugs with the brand names of Ritalin, Concerta, and Adderall. Jonas, Gu, and Albertorio-Diaz (2013) estimated attention-deficit/hyperactivity disorder (ADHD) medication usage at 3.2% of the adolescent population, an increase of 19-fold since the early 1990s (Jonas et al., 2012). The rate among adults 20–44 was estimated at 1.8% for males and 1.9% for females (Medco Health Solutions Inc., 2011).

Antipsychotics are medications used primarily in the treatment of schizophrenia and bipolar disorders but also increasingly in children with aggression, agitation, and disruptive

Table 2. Demographics and Clinical Characteristics of Children, Adolescents, and Adults Who Made Office-Based Physician Visits Resulting in a Mental Disorder Diagnosis, 2007–2010.^a

Characteristic	% of Visits Resulting in Mental Disorder Diagnosis		
	Children (n = 1,166)	Adolescents (n = 892)	Adults (n = 9,264)
Psychotropic medications			
Any	64.52	71.43	71.21
ADHD medications	55.76	36.70	7.69
Antipsychotics	11.06	18.30	15.04
Antidepressants	10.26	32.30	46.43
Anxiolytics	2.21	8.95	34.09
Mood stabilizers	4.29	9.85	8.24

Note. ADHD = attention-deficit/hyperactivity disorder. Adapted from Olfson, Blanco, Wang, Laje, and Correll (2014).

^aData are from the National Ambulatory Medical Care Survey. Children range in age from 0 to 13 years, and adolescents range in age from 14 to 20 years. Includes stimulants, atomoxetine hydrochloride, guanfacine hydrochloride, and clonidine hydrochloride.

behavior. Those in most common usage are called “atypical” or “second generation” antipsychotics (or neuroleptics). Brand names include Zyprexa, Risperidol, and Clozapine. One percent of U.S. adolescents were taking these antipsychotics (Jonas et al., 2013), with rates of slightly under 1% for young adults (Olfson, King, & Schoenbaum, 2015).

Mood stabilizers are used to treat bipolar disorder. Lithium is in this class along with brand names like Lamictal and Tegretol. Mood stabilizer usage is considerably lower than antidepressants and stimulants although its usage increased during the 1990s (Merikangas et al., 2007; Zito et al., 2003).

The final type of medication, anxiolytics, also called minor tranquilizers, is used in the treatment of anxiety. Familiar drugs in this category are Valium, Xanax, and Ativan. It is in common usage among adults but less so among youth (Olfson, Blanco, Wang, Laje, & Correll, 2014) whose usage may have not risen much during recent years (Jonas et al., 2012).

Do Psychiatric Medications Affect Conditions and Behaviors That Could Result in Less Crime?

There are few studies of the effect of medications on criminal behavior, but more on behaviors and conditions related to crime, particularly aggression. The aggression research has generally shown that among youth, most of the classes of psychiatric medication taken by youth do reduce aggression and substantially so. A meta-analysis of 28 studies found that for adolescents with ADHD, stimulant medication reduced overt aggression (clinician, parent, and teacher ratings) with an effect size of .84 and covert aggression with an effect size of .69 (Connor, Glatt, Lopez, Jackson, & Melloni Jr, 2002). A companion review of 33 studies (Connor, Boone, Steingard, Lopez, & Melloni, 2003) also found large effect sizes in treating overt aggression with antipsychotic medication, mood stabilizers, and antidepressants among children with a variety of mental

health problems. A later review (Robb, 2010) confirmed that double-blind placebo controlled randomized trials had demonstrated reductions in impulsive aggression among youth taking stimulants, mood stabilizers, and atypical antipsychotics. So there is fairly strong evidence that four classes of medication—stimulants, antidepressants, mood stabilizers, and antipsychotics—reduce aggression, although not necessarily crime in general, at least among youth.

Another way to look at the influence of medication on crime is to consider whether the conditions that medications treat effectively have been shown to be associated with criminal behavior. Although overall mental illness has not been demonstrated to be one of the most important factors in producing criminal behavior (Gendreau, Little, & Goggin, 1996), a few mental health conditions have demonstrated associations with crime, particularly psychosis, ADHD, and substance abuse. For example, a Swedish study found schizophrenia and psychosis were associated with about 5% of crime (Fazel & Grann, 2006). A meta-analysis of 20 studies (Pratt, Cullen, Blevins, Daigle, & Unnever, 2002) found a strong correlation between ADHD and criminal and delinquent behavior. In a 21-year longitudinal study in Denmark, children diagnosed with ADHD were approximately 5 times more likely to have a criminal conviction than children in the general population and 12 times more likely to be convicted for violent offenses (Dalsgaard, Mortensen, Frydenberg, & Thomsen, 2013). Many reviews have also found associations between crime and drug use and drug and alcohol dependence (Bennett, Holloway, & Farrington, 2008; Kopak, Vartanian, Hoffmann, & Hunt, 2013; Nordstrom & Dackis, 2011). The medications have been clearly shown to improve conditions like ADHD, psychosis, and substance abuse (Kelly, Daley, & Douaihy, 2012; Konstenius et al., 2014) and to the extent that these conditions are causally related to criminal behavior, then medication may have an ameliorative effect on crime.

Are Medications Being Prescribed in Populations and Contexts Where They Might Be Conducive to Reductions in Crime and Related Behaviors?

There is a considerable amount of mental illness among the criminal offender population. James and Glaze (2006) reported that 24% of state prisoners, 14% of federal prisoners, and 21% of jail inmates had a recent history of mental health problems, that is, a professional diagnosis or a receipt of treatment for a mental illness. The rate of current or recent mental health symptoms was considerably higher. According to the Georgia Department of Corrections data, the most common psychiatric disorders among offenders included depression and schizophrenia, followed by anxiety disorder and bipolar disorder (Moore, 2003).

Among youth, offenders rates of mental health disorder are even higher than among adults. Between 65% and 70% of youth in juvenile correctional and detention centers have a mental health disorder (Shufelt & Coccozza, 2006; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002; Wasserman, Ko, & McReynolds, 2004; Wasserman, McReynolds, Lucas,

Fisher, & Santos, 2002). According to Teplin, Abram, McClelland, Dulcan, and Mericle (2002), of the youth detained in Cook county facilities with psychiatric disorders, 21.3% of male youth and 30.8% of female youth had any anxiety disorder. An additional 18.7% of males and 27.6% of females had an affective disorder, 16.6% of males and 21.4% of females had an ADHD, 41.4% of males and 45.6% of females had disruptive behavior disorder, 51% of male youth and 47% of female youth had a substance use disorder, and 1% of both the male and female youth had psychotic disorders. Most of these disorders are amenable to treatment with medications.

Not much research is available on how large a portion of the identified adult offender population receives medication but some proportion certainly does. In 2000, before some of the large prescribing increases, approximately 10% of state prisoners were using psychotropic medications, and in five states (Hawaii, Maine, Montana, Nebraska, and Oregon) about 20% of state prisoners were using them (Beck & Maruschak, 2001). James and Glaze (2006) reported that the percentage of inmates in state prisons who were prescribed psychotropic medications had increased from 12% in 1997 to 15% in 2004.

Youth involved in the justice system also receive medications. Utilizing publicly available data from 55 county probation departments over the course of 8 years, Cohen, Pfeifer, and Wallace (2014) found that in juvenile detention centers, approximately one in five juveniles were on psychoactive medications. In another study of 668 juveniles from three secure facilities in one state, Lyons and her colleagues (2013) found that 10.2% of the youth were prescribed psychotropic medication within 1 month of their intake, and this did not count youth who were already on medication and received refills.

A key question is whether such medication helps reduce criminal behavior in the offender population, and unfortunately, there appear not to have been experimental studies on this question. However, some correlational studies have been done suggesting that this is the case.

Fazel, Zeterqvist, Larsson, Langstrom and Lichtenstein (2014) used nationwide registries in Sweden to examine criminal convictions among 82,647 individuals diagnosed with schizophrenia, bipolar disorder, depression, and other psychotic disorders who were receiving mood stabilizers or antipsychotics from 2006 to 2009. The researchers found that there was a 45% reduction in violent crime when patients were prescribed antipsychotics (compared to their own behavior without medication) and a 24% reduction in patients receiving mood stabilizers. However, the mood stabilizer effect only held true among patients diagnosed with bipolar disorder. Altogether, the researchers concluded that antipsychotics and mood stabilizers reduced the risk of violent crime.

In another set of studies, Van Dorn, Desmarais, Petrila, Haynes, and Singh (2013) examined the effects of routine outpatient treatment, including the use of psychotropic medication, on the risk of arrest among adults with serious mental illness. The researchers analyzed prescription and treatment data for adults and demonstrated that the receipt of monthly medication and outpatient services significantly lowered the

risk of arrest. Frankle and his colleagues (2001) also found lower rates of arrest among patients with psychosis who had been treated with Clozapine.

There have also been some studies showing that psychiatric medication for ADHD decreases the likelihood of offending or reoffending. For example, using a national sample of 25,656 patients diagnosed with ADHD from registries in Sweden from 2006 to 2009, Lichtenstein and his colleagues (2012) compared the crime rate among patients receiving ADHD medication with the crime rate among the same patients while they were not medicated. The rate dropped when patients were receiving medication by 32% for males and 41% for females. These results suggest that using ADHD medication may lower the risk of criminality among individuals diagnosed with ADHD. Dailley, Townsend, Dysken, and Kuskowski (2005) in a study of 31 formerly incarcerated youth diagnosed with bipolar disorder found their reoffending rate 4.8 times greater when the youth were off medication versus on medication.

In summary, there is some research that shows that certain classes of medication—mood stabilizers, antipsychotics, and stimulants—do reduce criminal behavior among at-risk populations of adults and youth. The effects can be quite substantial, reductions of a third or more for ADHD patients taking stimulants, and almost half for adults taking antipsychotics.

Could Medication Be Responsible for Population Level Effects Such as the Decline in Crime?

Two aspects of the research reviewed here suggest that there could be detectable population effects from medication. First is the substantial proportion of the population that is currently taking such medication. Second is the large effect that appears to be associated with the medication, suggesting large drops in aggression and criminality among individuals being treated.

We could locate only two studies that have looked at population-level effects, however. A study in the Netherlands (Bouvy & Liem, 2012) that utilized Health Care Insurance Board prescription information on three fourths of the Dutch population from 1994 to 2008 found a strong association between increased usage of antidepressants and declines in lethal violence. Changes in usage accounted for 65% of the variation in homicide. Interestingly, the association with homicide was as strong as the association with suicide.

Utilizing state-level panel data from 1997 to 2004 including data on crime and prescriptions, Marcotte and Markowitz (2011) found the expansion of psychotropic medications was associated with lower rates for violent crime but not property crime and had no significant effects on arrest rates or homicide rates. Specifically, newer antidepressants and stimulants used in the treatment of ADHD were negatively associated with the rates of violent crime. However, the estimated impact of expanded medication treatment on violent crime was small, accounting for only 5% of the decline.

Unfortunately, population-level correlations are a relatively weak test of any causal relation between medication and crime trends and are subject to the ecological fallacy. For example,

the association could be a general effect of mental health treatment rather than an effect specific to medication. Between the early 1990s and early 2000s, the proportion of persons with psychiatric disorders who received treatment increased over 50% (Kessler, Chiu, Demler, & Walters, 2005), much of it due to medication availability but not completely. But available studies are at least consistent with some population effects from medication increases.

What Medication Might Explain

The psychotropic hypothesis in regard to crime also needs to be considered in light of other evidence about crime. There have been many alternative explanations offered as possible reasons for the decline in crime. They include such factors as abortion legalization (Levitt, 2004), increased incarceration, the abatement of the crack cocaine epidemic (Blumstein & Wallman, 2000), changes in police tactics (Zimring, 2012), and removal of lead from the environment (Nevin, 2007). Such factors or others could provide some or all of the explanation for the trend, and the increase of psychiatric medication could be coincidental or a minor factor. This review is not the place for a full comparative analysis of explanations, but the psychiatric medication explanation does have some features that comport well with some of the empirical findings about the crime decline. These might lead one to see it as a plausible explanation that deserves equal consideration to other hypotheses.

1. Medication does provide an explanation that is consistent with crime trends that appeared to have had an inflection point in the early to mid-1990s. One of the more important types of medication, the antidepressant SSRIs, was authorized for treating depression in 1987. A few years thereafter, the rate of prescription for antidepressants began to rise rapidly, as did the stimulants (Figure 1).
2. The evidence suggests that declines in crime and violence occurred for both youth and adults and across a wide geographic and demographic spectrum. They were not confined to one region or urban areas alone. This is consistent with a mechanism like psychiatric medication that became available broadly across the population.
3. The evidence shows that crime declines have occurred in other countries besides the United States (Tseloni, Mailley, Farrell, & Tilley, 2010). Some of the most popular explanations for the crime decline (like the crack cocaine epidemic or incarceration rates) are specific to the United States (Zimring, 2007). By contrast, the increased availability of psychiatric medication is one explanation that applies across the developed world where modern drugs and medical care are available. It is an explanation more consistent with the international evidence about trends.
4. Improvements have also occurred in other problems and behaviors that might be explained by medication that are not well explained by other factors like criminal

justice policy. For example, suicide and suicidal ideation have declined (with an exception for men 25–64 in the period after 2000; Centers for Disease Control & Prevention, 2014). Physical and sexual abuse of children has declined (Finkelhor, Saito, & Jones, 2015). Juvenile bullying has declined (Finkelhor, 2013). There have been declines in alcohol usage and binge drinking among young people (Johnston, O'malley, Bachman, & Schulenberg, 2014). Psychiatric medication usage would have a plausible role in reducing suicide, alcohol usage, and child maltreatment which are all related to depression and mood problems.

Nonetheless, there are features of the crime decline picture that psychiatric medication cannot explain. For example, the research appears strongest in showing psychiatric medication's effects on aggressive behavior. But crime statistics also display declines in property crime that are as large or larger than the declines in violent behavior. An explanation could be constructed for how medication might reduce property crime: For example, the alleviation of anxiety might lessen the perceived need for property, or the reduction of impulsivity might increase the ability to inhibit the urge to take things. But based on current research the expectation might be for larger reductions in violent than property crimes, which is not what the crime trends show.

In addition, there is much that is not clear about the pathways between medication and criminal behavior. Reductions in aggression might be one mechanism, but other pathways may include reductions in negative ideation, reductions in anxiety about money or status, improved sleep patterns, or improved cognitive functioning, and these pathways would be expected to differ for different medications and different diagnostic populations. In summary, there are plausible reasons to hypothesize that psychiatric medication could have had a connection with declining crime rates, but there are far too many unanswered questions and missing pieces of evidence to have confidence that this is true.

Controversies About Medication Usage

The widening use of psychiatric medication has engendered its own share of controversies. A primary concern, especially in the face of the growing usage numbers, has been that these medications are being overprescribed, especially to young people, who may not qualify for a true psychiatric diagnoses (such as ADHD or depression; Smith, 2012). A variant of this concern alleges that they are being used by parents and school personnel to manage disruptive behavior rather than treat psychiatric disorders. These concerns have been supported by some epidemiologic research (Angold, Erkanli, Egger, & Costello, 2000) that, for example, found that the majority of stimulant treated children did not meet the full diagnostic criteria for ADHD and that oppositional behaviors increased the probability of stimulant prescription. However, epidemiologic research has also found underprescription to be a problem, showing that

the majority of youth who did qualify for a diagnosis of ADHD based on symptom assessment were actually not receiving medication and that prescription rates were lower for minorities who needed it (Jensen et al., 1999). This suggested that underprescribing is as much a problem as overprescribing, although both are frequent occurrences in the utilization of medications in general.

There is also a problem of young people using stimulant medication for nonmedical purposes. In surveys of college populations, lifetime nonmedical usage has been estimated at from 7% to 35%, primarily to improve academic performance (McCabe, Knight, Teter, & Wechsler, 2005; Vidourek, King, & Knopf, 2010). The potential for misuse has added to concerns about prescribing practices.

The evidence reviewed here that medications reduce aggression is certainly consistent with the idea that one goal and motive for psychiatric prescription among parents, educators, and criminal justice authorities may be to control antisocial behavior in some populations. If that means that diagnostic issues are being ignored or criteria fudged, it raises important ethical, legal, and medical questions.

Another controversy concerns the severity of side effects associated with psychiatric medication. There is a substantial literature on this subject that cannot be summarized here (Almandil et al., 2013; Dols et al., 2013; Graham & Coghill, 2008; National Institute of Mental Health, 2012; Whiskey & Taylor, 2013). Some of the popularity of the current generation of medications does relate to the relative scarcity of serious side effects. But the controversies are particularly strong with regard to young people, for whom the side effects have not been so widely studied (Gordon & Melvin, 2013). One of the biggest concerns has been the possibility that the antidepressants actually increase suicides and suicide attempts among youth. One review has found a small increase in suicide ideation and attempts (Moller et al., 2008), but other research claims reductions in suicide among young people taking antidepressants. Clearly, the implications of overprescription change depending on how serious and widespread are the possible negative side effects.

The debate about the appropriate usage of psychiatric medication utilization is also complicated by controversies over the role of pharmaceutical companies in promoting usage, the expertise of nonspecialist professionals (primary care doctors rather than psychiatrists), and the balance of influence of physicians compared to nonmedical psychotherapists in the mental health field. But the question about whether medication plays a possible role in reducing costly and damaging social problems such as crime could certainly have some relevance to the controversy about the desirable level of prescription, and the balance to be sought between more liberal and more restrictive standards.

Research Agenda

The literature reviewed here suggests a number of research priorities, including both experimental and quasiexperimental

studies that could have important implications for public policy and mental health treatment. The initial question is whether psychiatric medication of any sort results in crime reduction. Experimental studies have examined aggression reduction as an outcome, particularly among youth, but additional experiments are needed that track criminal behaviors—violent and property crime, sex offenses, and child abuse. The research needs to be conducted with adults in addition to youth. One obvious design is for an identified offender population to be more thoroughly evaluated on their need for medication, making it freely and more readily available, and tracking their recidivism in contrast to an offender population without this medication intervention. Such studies should have a longitudinal component that covers a typical 5-year recidivism window. A particularly important offender population to study with such a design is sex offenders, since antidepressants have been shown to have an depressing effect on sexual interest and functioning in as many as half of all recipients (Balon, 2006; Clayton et al., 2002; Montejo, Llorca, Izquierdo, & Rico-Villademoros, 2001), and at least one study has found a reduction in paraphilic activity in patients treated with SSRIs (Kraus et al., 2007). Although experimental designs can be ethically challenging, because assessment and treatment resources are often scarce, randomized assignment of treatment has been feasible in some offender research (Marques, 2005).

Similar experimental crime reduction designs could be carried out in general populations, particularly ones that have had in the past had relatively low access to mental health services. The experimental jurisdiction, for example, schools, could be provided with improved access to mental health evaluations and medication, and the subsequent crime records of this population compared to a control jurisdiction without such enhanced access. In addition, since experimental designs will continue to be carried out by pharmaceutical researchers testing new psychiatric medications as part of the approval process, it would be desirable for those studies to include measures of criminal involvement and criminal behavior that could be analyzed at least in meta-analyses.

There are also nonexperimental studies that could be carried out to examine the hypothesis that usage of medication is associated with less offending. For example, recidivism studies should try to add prescription information to analyses to see if prescription history explains variation in offending beyond other known predictors. Researchers should look retrospectively for juvenile facilities or systems where new psychiatric access was made available and compare the subsequent records of their populations to other facilities or systems without such access. Additional studies like Marcotte and Markowitz (2011) should look at aggregate prescribing of psychiatric medicines and the crime rates specific to various population subgroups in those jurisdictions to find possible covariation over time.

If research seems to support the overall hypothesis of whether medication reduces criminal activity, then a variety of subsequent questions come to the fore. These concern the benefit for offending reduction of specific kinds of medication for specific populations, the merits of medication compared to

other kinds of nonpharmaceutical mental health intervention, and the utility of medication for individuals who may not fully qualify for psychiatric diagnoses such as ADHD or depression. Although the current generation of psychiatric medicines may or may not be shown to have effects on criminal offending, it seems likely that some pharmaceutical agents will have such effects at some time in the future. Those who develop, evaluate, and monitor the introduction of these medications should bear this in mind and be careful to organize research in a fashion to examine such effects.

Conclusion

It is clear that psychiatric medication has become an important and growing feature of modern society. An understanding of the relationship of this phenomenon to criminal behavior and crime trends would seem a crucial adjunct to the agenda of the fields of both mental health and criminology.

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