2013

Paved with Good Intentions: Sentencing Alternatives from Neuroscience and the Policy of Problem-Solving Courts

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PAVED WITH GOOD INTENTIONS: SENTENCING ALTERNATIVES FROM NEUROSCIENCE AND THE POLICY OF PROBLEM-SOLVING COURTS

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ABSTRACT

Advances in basic and clinical neuroscience will soon present novel options for prediction, treatment, and prevention of antisocial behavior, particularly drug addiction. These hard-won advances have significant potential to improve public health and safety and increase efficiency in delivery of treatment and rehabilitation. Moreover, such therapies will undoubtedly find a large portion of their target population in the criminal justice system as long as drug possession remains criminalized. Improvements, however, are not without risks. The risks stem not only from the safety and side-effect profile of such treatments, but also from their insertion into a criminal justice and sentencing system that may be overburdened, overpoliticized, undertheorized, and lacking sufficient checks and balances on institutional competency and legitimacy.

Furthermore, as neurological and biological therapies become more targeted and effective, they may threaten to override multi-faceted rehabilitation measures designed to address the social, cultural, economic, and psychological aspects of drug use and involvement with the criminal justice system. While offering substantial therapeutic benefits, such advances might also short-circuit a critical policy discussion about the nature of drug use and its criminalization.

New neuroscience treatments for addiction and antisocial behavior should force a deep examination of the legal, social, political, and ethical

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roots of drug and problem-solving courts, and particularly the mixed criminal justice/public health model on which they rest. As technologies to control behavior become more direct, targeted, and powerful, so do the risks of their misuse and potential harms to constitutional rights, individual autonomy, institutional competency, and institutional legitimacy.

INTRODUCTION

California has a not-so-distant history of therapeutic interference in the brains of criminal offenders. UCLA hosted the "Violence Project" in the early 1970's, and there are reports of experimental psychosurgery in the Vacaville state correctional facility in the same time period.[1] These programs were designed to take advantage of cutting-edge understanding in psychology and neuroscience to fix a politically problematic crisis in rising crime rates. Such efforts were reportedly abandoned after political backlash against abusive research and treatment practices.[2] This historical context, coupled with present-day procedures that may give an undue sense of sophistication, should make the criminal justice system particularly cautious about adopting new and potentially invasive neuroscience technologies even if guided by the legitimate and compassionate goals of treating public health problems and promoting public safety.

Advances in basic and clinical neuroscience will soon present novel options for prediction, treatment, and prevention of antisocial behavior, particularly drug addiction. These hard-won advances have significant potential to improve public health and safety and increase efficiency in delivery of treatment and rehabilitation. Moreover, such therapies will undoubtedly find a large portion of their target population in the criminal justice system as long as drug possession remains criminalized. Improvements, however, are not without risks. The risks stem not only from the safety and side-effect profile of such treatments, but also from their insertion into a criminal justice and sentencing system that may be overburdened, overpoliticized, undertheorized, and lacking sufficient checks and balances that provide institutional competency and legitimacy.

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1. "In his 1973 State of the State message, California governor Ronald Reagan announced plans for the establishment of a biomedical facility, the Center for the Study of the Reduction of Violence. Supported by state and federal funds, the first center was planned for the psychiatry department at UCLA, headed by Louis Jolyn 'Jolly' West." Allen L. Barker, *Leonard Kille and Documented Brain Implant Victims,* http://www.bio.net/bionet/mm/neur-sci/2004-August/058980.html (Aug. 29, 2004 11:31 AM). Rudimentary information on psychosurgery experiments at Vacaville was published in the Napa Sentinel in 1991. Harry V. Martin & David Caul, *Mind Control*, SONIC.NET, http://dmc.members.sonic.net/sentinel/gvcon8.html (last visited Jul. 24, 2012).

2. *Id.*

Furthermore, as neurological and biological therapies become more targeted and effective, they may threaten to override multi-faceted rehabilitation measures designed to address the social, cultural, economic, and psychological aspects of drug use and involvement with the criminal justice system. Critically, effective therapies for addiction may obscure a more complex social and political problem: highly effective treatments delivered through the criminal justice system might short-circuit a critical policy discussion about the nature of drug use and its criminalization.

For these reasons, new neuroscience treatments for addiction and antisocial behavior should provoke a deep examination of the legal, social, political, and ethical roots of drug and problem-solving courts, and particularly the mixed criminal justice/public health model they rest on. As technologies to control behavior become more direct, targeted, and powerful, so do the risks of their misuse and potential harms to constitutional rights, individual autonomy, and ultimately institutional competency and legitimacy.

The goal of this paper is to present the anticipated therapeutic options from neuroscience and outline critical issues with respect to their potential integration into criminal justice and sentencing law and policy. Part I introduces forthcoming neuroscience technologies related to antisocial behavior prediction, treatment, and prevention, with an emphasis on therapies to treat drug addiction. Part II assumes that drug courts will be the entry point of these therapies into the criminal justice system. Thus, Part II outlines the components of a cost-benefit analysis of integrating such therapies and considers the implications for currently used intermediate sanctions and diversionary programs providing drug treatment. Part III then argues that beyond such a cost-benefit or evidence-based policy analysis, the unique characteristics of novel treatments and therapies from neuroscience squarely raise fundamental questions about the nature of coerced treatment at the heart of drug courts and the policy and jurisprudential justifications thereof. The brain-invasive nature of certain novel therapies provokes discussion of the proper institutional role and competencies of a drug court and its participants. Critiques of this central issue have been raised before: the setting-aside of the traditional adversarial model for a therapeutic team-based model *leveraged* by the criminal justice system. Despite criticism, drug courts have proliferated.[3] The opportunity to directly

3. Approximately 2,400 drug courts serve about 117,000 drug offenders throughout each of the fifty states in the United States today. *See* WEST HUDDLESTON, III & DOUGLAS E. MARLOWE, NAT'L DRUG COURT INST., PAINTING THE CURRENT PICTURE: A NATIONAL REPORT ON DRUG COURTS AND OTHER PROBLEM-SOLVING COURT PROGRAMS IN THE UNITED STATES (July 2011), *available at* http://www.ndci.org/publications/painting-current-picture.

manipulate a person's brain should reignite debate about the proper composition, procedures, and theory behind drug courts, and ultimately more fundamental questions about drug criminalization policy. Similar critiques have been offered from philosophical and socio-political perspectives.[4] This article complements those critiques and postulates that they may gain traction among policy makers and drug court overseers when confronted with novel risks posed by treatments from neuroscience. I conclude with the idea that "beneficence is not enough" when mixing medicine and the threat or consequence of criminal punishment, and that the availability of good tools to implement good intentions for good outcomes should not override important fundamental legal principles such as due process and separation of powers that function to preserve individual rights and autonomy.

I. ANTICIPATED NEUROSCIENCE TECHNOLOGIES WITH POTENTIAL IMPACT ON ANTISOCIAL BEHAVIOR

Neuroscience research proceeds with two goals: the first is to understand, and therefore to predict; and the second is to manipulate, treat, or intervene for the benefit of the human subject. The scientific overview that follows focuses on research and development that may have an impact on understanding and treating "antisocial behavior," roughly characterized as behavior that violates the criminal law or behavior that often substantially interferes with normal life pursuits, such as serious substance addiction.[5] This overview does not attempt to engage with any single criminological theory of what causes antisocial behavior, and in particular, does not advocate for a bio-criminologic theory of the antecedents of criminal or antisocial behavior.[6] This overview also does not take a

4. *See, e.g.*, Eric J. Miller, *Drugs, Courts, and the New Penology*, 20 STAN. L. & POL'Y REV. 417 (2009); Douglas Husak, *Retributivism, Proportionality, and the Challenge of the Drug Court Movement, in* RETRIBUTIVISM HAS A PAST: HAS IT A FUTURE? (Michael Tonry ed., 2012).

5. *See* Gerald R. Patterson, Barbra DeBaryshe & Elizabeth Ramsey, Or. Soc. Learning Ctr., *A Developmental Perspective on Antisocial Behavior*, 44 AM. PSYCHOLOGIST 329, 329 (1989).

6. *See, e.g.*, Peter Monaghan, *Biocriminology*, 55 CHRON. HIGHER EDUC., no. 32, Apr. 17, 2009 at B4, B4-B5 (describing the re-emergence of a subfield of criminology due to expansion of understanding of the biological bases of human behavior: "By taking into account that human beings are not just social and cultural creatures but biological ones, too — in fact, biologically inclined to be social and cultural — criminologists will learn more about the sources of crime, . . . and that should lead to better policy.").

position on competing philosophical or political theories of addiction.[7] Nor does this overview mean to suggest that such understanding and therapies from neuroscience should be the sole or even primary avenue of research or development when it comes to the modification of antisocial or self-destructive behavior. Rather, this section attempts a realistic but optimistic look at what is coming down the scientific pipeline, so that such advances can be put into an appropriate normative and policy context with respect to their societal impact. While the remainder of this paper focuses on addiction and drug courts, the neuroscience reviewed here is broader in scope. Addiction and drug courts are but one hook for the entire scope of research reviewed here. Behavior manipulation technologies may take many forms and enter the criminal justice or public health system in ways not yet anticipated. The spadework presented in Parts II and III with respect to drug courts is done as an exemplar for how neuroscience may meet law in a practical, low-level, administrative, relatively routine, and ultimately structural context. Other examples abound, but are beyond the scope of this paper. Behavior prediction, in particular, may have an outsize impact well exceeding the predictable drama of trial evidence. This section will briefly highlight ongoing research that relates to neuroscience-based antisocial behavior prediction before moving on to therapies targeted towards drug addiction.

A. Prediction of Behavior and Treatment Response

The criminal justice system, and subsidiary drug and problem-solving courts, would undoubtedly benefit from the ability to predict future behavior and accurately anticipate the effects of intervention. Such prescience would assist policymakers and the criminal justice system in efficiently allocating resources for desired outcomes. For example, a judge may have increased confidence in deciding who to incarcerate because of future dangerousness versus who to send to a community corrections program. Drug court screening processes, discussed in Part II *infra*, would certainly be impacted.

Correctional institutions in several jurisdictions now commonly deploy actuarial tools for risk assessment based on empirical research.[8] These

7. *See* Douglas Husak & Emily Murphy, *The Relevance of the Neuroscience of Addiction to the Criminal Law*, *in* A PRIMER ON CRIMINAL LAW AND NEUROSCIENCE (forthcoming 2013).

8. Examples of actuarial risk-assessment screening tools in use by criminal justice departments include the Level of Service Inventory Revised: Screening Version, *see* Don Andrews & James Bonta, *Psychological Assessments and Services, Level of Service Inventory Revised,* MULTI-HEALTH SYSTEMS, INC., http://www.mhs.com/product.aspx?gr=saf&prod=lsi-rs&id=overview (last visited Aug. 5,

tools make predictions based on observable characteristics such as demographics, criminal history, and behavioral features. Research into the neural basis of psychopathy,[9] addiction, and other antisocial behavior may further focus and refine such actuarial prediction tools by adding information about an individual's neural mechanisms.[10]

Three decision-making strategies may make different predictive use of neuroscience information. The first is diagnosing offenders into categories with known elevated risks of recidivism, such as psychopaths. The second is identifying certain offenders within a particular class who are more dangerous than others. The third is using measures such as brain scans and genetic profiles to predict which among several treatment options might work for a particular individual.[11] For a drug court seeking to pair clients

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2012);, the California Static Risk Assessment, *see* Susan Turner & Jesse Jannetta, *California Static Risk Assessment*, NAT'L INST. OF CORRECTIONS, (Apr. 2, 2009), http://nicic.gov/Library/023641; and the newer Classification of Violence Risk, John Monahan et al., PAR, INC., *Classification of Violence Risk*, http://www4.parinc.com/Products/Product.aspx?ProductID=COVR (last visited Aug. 14, 2012).

9. *See* Greg Miller, *Investigating the Psychopathic Mind*, 321 SCI. 1284, 1284 (2008). Psychopathy is a serious personality disorder that has long been of interest in criminological research. *Id.* More recently, it has become the focus of neuroscience research, with the goal of using neuroimaging and genetics to understand the underlying neurobiological basis of the suite of emotional and interpersonal characteristics that make up the profile. *Id.* at 1285. Psychopaths exhibit an extreme lack of empathy, glibness, high levels of risk taking, pathological lying, grandiosity, and highly antisocial behavior, while being very cunning and manipulative of others. *Id.* They make up an estimated 1% of the general population, but an estimated 25-40% of the incarcerated population. *Id.* Psychopaths have been shown to have incredibly high rates of recidivism, which strongly correlates with the extremeness of the cluster of psychopathy symptoms. *Id.* Current assessment via the interview-based Psychopathy Checklist Revised (PCL-R) is often part of parole assessment. Research in incarcerated populations in New Mexico by Kent Kiehl and colleagues is attempting to discover the neural basis of psychopathy by obtaining structural and functional brain scans from volunteer inmates. *Id.* at 1284. One of several goals of this data collection is to see whether specific neural signatures might be associated with psychopathy, and if, in turn, such biological measures might be used to refine or speed up the diagnostic process or to enable novel therapies. *Id.* at 1286.

10. A recent example of how neural signal information from a brain scan can improve predictions beyond those derived from self-report measures was reported by Emily B. Falk et al., *Predicting Persuasion-Induced Behavior Change from the Brain*, 30 J. NEUROSCI. 8421, 8421 (2010). Neural responses to persuasive messages to use sunscreen were found to improve predictions of actual behavior within the following week, beyond predictions made based on what subjects reported to be their intentions and attitudes towards sunscreen use after exposure to the messages. *Id.* at 8423-24. Even more recently, Eyal Aharoni and colleagues reported that brain activity in a particular region—closely associated with impulsivity—predicted felony rearrests after offender release. Eyal Aharoni et al., *Neuroprediction of Future Rearrest*, PROC. NAT'L ACADEMY SCI. 6223 (2013).

11. Efforts at predicting treatment response span from pharmacogenetic and epigenetic research to brain scanning. At present, there have been more disappointments than success. However, one model for this type of work is the genetics of serotonin transporter alleles. *See, e.g.*, Avshalom Caspi et al., *Influence of Life Stress on Depression: Moderation by a*

with effective treatment and minimize relapse and recidivism, the third method may be of significant utility if it leads to a cost-effective refinement of diagnostic procedures. To incorporate such information, however, a decision maker must understand that brain scanning or genetic profiling alone will not provide enough information to support decisions about a person's future behavior or treatment outcomes.[12] There is almost certainly no simple biomarker that by itself is highly predictive of future behavior.[13] Complex behavior is mediated through constantly communicating neural circuits and interaction with dynamic physical and social environment. Moreover, the application of prediction research to individuals in a criminal justice context will be hindered by the reality of substantial individual differences that are deliberately obscured in group-based studies.[14] Brain scanning or genetic profiling should thus be only a component of a risk assessment prediction and is extremely unlikely to be dispositive on its own. Whether it is cost-effective in terms of the additional predictive validity it provides at an individual level remains an open empirical

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Polymorphism in the 5-HTT Gene, 301 SCI. 386, 386 (2003); Kenneth S. Kendler et al., *The Interaction of Stressful Life Events and a Serotonin Transporter Polymorphism in the Prediction of Episodes of Major Depression: a Replication,* 62 ARCH. GEN. PSYCHIATRY 529, 529 (2005); Murray B. Stein et al., *Serotonin Transporter Gene Promoter Polymorphism Predicts SSRI Response in Generalized Social Anxiety Disorder,* 187 PSYCHOPHARMACOLOGY 68, 68 (2006). Having two short alleles is associated with enhanced vulnerability to depression after traumatic life event triggers and reduced responsiveness to selective serotonin reuptake inhibitors (SSRI) therapy for emotional and anxiety disorders. *Id.* One short and one long allele seem to convey some resilience and better responsiveness to SSRI therapy and two long alleles conveys even greater resilience and responsiveness to SSRI therapy. *Id.* Of course, these are population averages, but this type of work may have practical utility in predicting the type of pharmacological therapy that should be deployed in a particular person, rather than a trial-and-error approach so often attempted in the clinic.

12. *See, e.g.*, Chun Siong Soon et al., *Unconscious Determinants of Free Decisions in the Human Brain,* 11 NATURE NEUROSCI. 543, 543 (2008). One set of advancements, however, may help refine the predictive power of brain scans by looking for subtle patterns of activation rather than gross differences in activity in a given voxel (a representation of a cube of brain tissue, akin to a 3-D pixel). *Id.* This analytic technique, known generally as multivariate pattern analysis (MVPA), uses machine learning (such as support vector machines) to assess changes in subtle and discrete patterns of activity. This exciting advancement is expected to underlie major strides in behavioral neuroscience research, as it more closely reflects the incredibly complex and interconnected nature of the brain.

13. *See* Aharoni et al., *supra* note 10, at 664 ("We are skeptical that emerging neurobiological markers could ever independently outperform these existing tools in sensitivity and specifcity, but they could potentially improve overall risk estimates in combination with known psychosocial risk factors.").

14. *See generally* Teneille Brown & Emily Murphy, *Through a Scanner Darkly: Functional Neuroimaging as Evidence of a Criminal Defendant's Past Mental State,* 62 STAN. L. REV. 1119, 1182 (2010) (discussing the group-to-individual inference problem in the context of brain scanning for forensic or diagnostic purposes).

question requiring an answer before any potential use within the medical diagnostic or criminal justice contexts.

Of course, none of these technological advances do the normative work of deciding the best course of action to take with any particular individual, or even with particular groups of persons: diversion programs, traditional confinement, or civil commitment. Neuroscience cannot directly help us differentiate between such options, but it might incrementally assist in the initial decision of who to release, monitor, or detain, or which treatment to attempt based on empirical information about an individual's likely response.

B. Behavioral Modification: Novel Therapeutic Options for Drug Addiction

Treatment informed by neuroscience is anticipated to be one of the major contributions of brain sciences to the criminal justice system, particularly in the realm of therapies for drug and alcohol addiction.[15] Drug addiction is a chronic and relapsing disorder of compulsive drug seeking and taking in the face of adverse consequences.[16] Addiction is an enormous public health problem, with estimates of the societal cost exceeding $275 billion dollars per year in lost productivity, medical expenses, and crime.[17] In a 2004 survey, the Bureau of Justice Statistics estimated that about 53% of state and 45% of federal prisoners met *Diagnostic and Statistical Manual for Mental Disorders* (DSM-IV),[18] criteria for drug abuse or dependence.[19] To understand how present and novel therapies for drug addiction work, a brief overview of the current neuroscientific understanding of drug addiction is presented below.[20]

The neural correlates of addiction are characterized as a series of staged physical changes corresponding to the psychological/behavioral aspects of addiction: binging/intoxication, withdrawal, and preoccupation

15. Henry T. Greely, *Neuroscience and Criminal Justice: Not Responsibility but Treatment*, 56 U. KAN. L. REV. 1103, 1104 (2008).

16. George F. Koob & Nora D. Volkow, *Neurocircuitry of Addiction*, 35 NEUROPSYCHOPHARMACOLOGY 217, 217 (2010) (citation omitted).

17. SCHNEIDER INST. FOR POL'Y AT BRANDEIS UNIV., SUBSTANCE ABUSE: THE NATION'S NUMBER ONE HEALTH PROBLEM 18 (J.J. Stein ed., 2001).

18. *See* AM. PSYCHIATRIC ASS'N, DIAGNOSTIC & STATISTICAL MANUAL OF MENTAL DISORDERS (4th ed. 2000).

19. Christopher J. Mumola & Jennifer C. Karberg, U.S. DEP'T OF JUSTICE, NCJ 213530, DRUG USE AND DEPENDENCE, STATE AND FEDERAL PRISONERS, 2004, at 1 (rev. ed. 2007) (2006).

20. A slightly more robust overview can be found in Husak & Murphy, *supra* note 6.

or craving.[21] Distinct neural systems have been found to mediate each of these stages and are modified with long-term drug use such that the neural and behavioral changes occur together in a negative feedback loop as drug use escalates and persists.[22] One major change pathway is as follows: in the early stages of drug-taking, elevated levels of the neurotransmitter dopamine (a consequence of intoxication) in the mesolimbic neural pathway convey an enhanced salience signal, which serves to modify neural connections and reinforce conditioned effects of drug-taking such as rewarding association of the drug with environmental context and particular cues (including particular people, objects, or sensations and perceptions).[23] In essence, initial drug exposures create the first neural impressions of a powerful memory related to a rewarding experience.[24] Drug-induced enhancement of conditioned-reinforcing effects interacts with executive cognitive functions that integrate sensory, emotional, contextual, and cue-responsive inputs to modify behavioral output.[25] As drug taking persists, this interaction is thought to shift from a neural system that selects among goal-based action plans to one primarily driven by persistent, stimulus-driven, goal-insensitive habits, and eventually to one driven by powerful compulsions to seek and take yet more drugs, which is the hallmark of drug addiction.[26]

Drug abuse and addiction can be described as parallel (and intimately related) tracks of changes in brain plasticity—how cells in the brain are wired together to communicate—and changes in an individual's psychology and behavior. For example, long-term drug taking modifies the availability of neurotransmitter receptors in brain cell membranes, which alters neuronal connections and thus disrupts normal brain functions.[27] Long-term changes in receptor availability and neural connectivity are thought to be major components of the escalation and maintenance of drug use, as well as the development and persistence of

21. Koob & Volkow, *supra* note 16.

22. *Id.*

23. *Id.*

24. *See* Barry J. Everitt & Trevor W. Robbins, *Neural Systems of Reinforcement for Drug Addiction: From Actions to Habits to Compulsion*, 8 NATURE NEUROSCI. 1481, 1483 (2005); *see generally* Julie A. Kauer & Robert C. Malenka, *Synaptic Plasticity and Addiction*, 8 NATURE REVS. NEUROSCI. 844 (2007) (citation omitted).

25. *Id.*; *see* STEVEN HYMAN, ROBERT MALENKA & ERIC NESTLER, MOLECULAR NEUROPHARMACOLOGY: A FOUNDATION FOR CLINICAL NEUROSCIENCE (Anne Sydor & Regina Y. Brown eds., 2d ed. 2008).

26. *See* Everitt & Robbins, *supra* note 24; Peter W. Kalivas & Charles O'Brien, *Drug Addiction as a Pathology of Staged Neuroplasticity*, 33 NEUROPSYCHOPHARMACOLOGY 166 (2008).

27. Koob & Volkow, *supra* note 16.

addictive behaviors and the difficulty of treatment and relapse prevention.[28] These "neuroadaptive" changes are thought to be sequential and cumulative, beginning with firing pattern alterations in the mesolimbic dopamine system after even limited drug exposure, as described above.[29] These changes seem to trigger the next set of neural plasticity changes in the ventral striatal area, where altered neurotransmission induced by drug exposure creates a feedback loop in the basic circuit that subserves learning by categorizing a particular experience as highly salient, which has impacts on attention, motivation, and learning.[30] As drug taking persists, the next phase of neural alterations engages the dorsal striatum, which subserves habit (stimulus-response) learning and habit execution.[31] Human imaging studies have shown that, at this point, merely displaying drug-associated stimuli can increase dopamine in the dorsal striatal areas of addicted subjects, an effect that correlates with self-reported measures of craving.[32] Cortical areas involved in motivation and control of impulsive and compulsive behavior, which feed back to affect dopamine release in response to conditioned cues, are also recruited by the synaptic plasticity changes triggered by drug use, exacerbating the usurpation of the learning, motivational, and attentional systems that normally control behavior.[33] The frontal cortex (which controls integration of information from other brain systems leading to planning, value-based decision-making, insight and behavioral control) and its projections to systems subserving emotional and memory functions are also disrupted in addiction.[34] The complete effect of drug addiction on the brain is usurpation of the neural bases of the cognitive and emotional systems that regulate behavioral control.[35] Overall, the best single-word description of the neural and psychological changes in drug addiction is a "hijacking" of the brain's normal learning, behavioral planning, and control systems.

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28. *Id.*

29. *Id.*

30. *See generally* Nora D. Volkow, J.S. Fowler, Gene-Jack Wang & J.M. Swanson, *Dopamine in Drug Abuse and Addiction: Results from Imaging Studies and Treatment Implications*, 9 MOLECULAR PSYCHIATRY 557 (2004).

31. *Id.* at 561-62.

32. Nora D. Volkow et al., *Dopamine Increases in Striatum do not Elicit Craving in Cocaine Abusers Unless they are Coupled with Cocaine Cues*, 39 NEUROIMAGE 1266, 1266 (2008).

33. *See* Koob & Volkow, *supra* note 16.

34. Rita Z. Goldstein & Nora D. Volkow, *Drug Addiction and its Underlying Neurobiological Basis: Neuroimaging Evidence for the Involvement of the Frontal Cortex*, 159 AM. J. PSYCHIATRY 1642, 1642-52 (2002).

35. *Id.*

1. Treating Drugs with Drugs: Current Antagonism and Substitution Therapies

Given that long-term drug taking has such widespread and powerful effects on brain plasticity, research into treatments for addiction is looking beyond currently available pharmacological therapies.[36] At present, pharmacological treatment for addiction generally takes one of two forms: substitution or antagonism therapies.[37] Within these two major categories, there is a limited armamentarium of FDA-approved drugs, some of which are presently used in treatment programs such as those linked to drug courts.[38] As with all prescription drugs, these therapies must be prescribed by a licensed physician, and are further regulated by federal statutes governing the use of "scheduled" prescription drugs with abuse potential.[39] These therapies, which are already in use and relatively familiar to the medico-legal community, will be briefly described to serve as a point of comparison with anticipated therapies.

In pharmacological substitution therapies, the drug of abuse is effectively replaced by a copycat of the substance that acts at the same receptors, to a lesser degree and sometimes via an alternative route of administration, with the goal of reducing cravings for and symptoms of withdrawal from the illicit or abused substance. Substitution therapies are FDA approved for opiate (i.e. heroin or prescription painkiller) and alcohol addiction, with some off-label benefits also reported for polydrug users who additionally abuse stimulants, such as cocaine.[40] Currently available substitution treatments for opiate addiction are methadone and buprenorphine, both of which act as agonists at the opioid receptors in the brain: inducing feelings of comfort short of euphoria, and preventing craving and withdrawal symptoms.[41] These therapies are used in a regimen of detoxification, stabilization, and long-term maintenance of an addict's

36. Nora D. Volkow & Phil Skolnick, *New Medications for Substance Abuse Disorders: Challenges and Opportunities*, 37 NEUROPSYCHOPHARMACOLOGY REVIEWS 290, 291 (2012).

37. *See, e.g.*, Bisaga & Popik, *In Search of a New Pharmacological Treatment for Drug and Alcohol Addiction: N-methyl-D-aspartate (NMDA) antagonists*, 59 DRUG & ALCOHOL DEPENDENCE 1, 1-2 (2000).

38. *See* DONALD F. ANSPACH & ANDREW S. FERGUSON, U.S. DEP'T OF JUSTICE, NCJ 202901, ASSESSING THE EFFICACY OF TREATMENT MODALITIES IN THE CONTEXT OF ADULT DRUG COURTS, FINAL REPORT (2003), *available at* https://www.ncjrs.gov/pdffiles1/nij/grants/202901.pdf.

39. Controlled Substances Act, Pub. L. No. 91–513, 84 Stat. 1236 (Oct. 27, 1970) (codified as amended at 21 U.S.C. § 801).

40. *See* 42 C.F.R. § 8.12 (h)(2)(i) (2011).

41. *See id.*

physical symptoms of drug addiction.[42] Methadone, a schedule II drug, must be administered daily in a regulated clinic,[43] putting resource constraints on meeting a population need in both crowded urban and underserved rural settings. Buprenorphine is an opioid partial agonist, approved by the FDA in 2002 and available in oral dosing formulations that, in combination with the long-acting pharmacokinetics, allow a treatment-compliant patient to self-dose at home every two or three days rather than going to a clinic every day.[44] Buprenorphine, particularly in combination with naltrexone, an opiate antagonist, has also shown some beneficial effects in polydrug addiction, particularly cocaine and alcohol addiction in addition to opiate dependence.[45] The mechanisms behind the full range of buprenorphine's effects are not fully understood, though hypothesized to be related to the complexities of its effects at different subtypes of endogenous opiate receptors.[46]

Antagonism therapies, instead of mimicking the drug of abuse at the brain's receptors, act to physically block a drug's access to a receptor or to provoke adverse effects if the abused drug is ingested.[47] One example of this type of drug therapy that has received interest from the medico-legal community for its use in criminal justice populations is naltrexone.[48] Naltrexone is a synthetic opioid that blocks receptors and prevents others

42. James J. Manlandro, Jr., *Using Buprenorphine for Outpatient Opioid Detoxification*, 107 J. AM. OSTEOPATHIC ASS'N, No. 9 ES11, ES12 (Supp. 5 2007).

43. *Id.* at ES11.

44. The Drug Addiction Treatment Act of 2000, Pub. L. No. 106-310, Div. B., Title XXXV § 3502, and its 2006 amendment, Office of National Drug Control Policy Reauthorization Act of 2006, Pub. L. No. 109-469 § 1101, 120 Stat. 3502 (codified as amended at 11 U.S.C. § 823), amended the Controlled Substances Act, Pub. L. No. 91-513, 84 Stat. 1242 (codified as amended in scattered sections of 21 U.S.C.), to enable physicians, rather than federally regulated clinics, to offer Schedule III, IV, or V opioid medications (such as buprenorphine and its combination with another opioid antagonist, naloxone) to treat opioid addiction. *See id.* at ES11. This federal regulation permitting office-based treatment with scheduled drugs was intended to increase access to addiction therapies. *See id.*

45. D.J. McCann, *Potential of Buprenorphine/Naltrexone in Treating Polydrug Addiction and Co-Occurring Psychiatric Disorders*, 83 CLINICAL PHARMACOLOGY & THERAPEUTICS 627, 627 (2008).

46. *Id.*

47. An aversive therapy for alcohol abuse was accidentally discovered when workers in a plant exposed to disulfiram vapors became violently ill upon ingesting alcohol. Disulfiram, which interferes with the metabolism of alcohol and provokes nausea, vomiting, and other extremely unpleasant reactions, is marketed for the treatment of alcohol addiction as Antabuse. *See* Helge Kragh, *From Disulfiram to Antabuse: The Invention of a Drug*, 33 BULL. HIST. CHEMISTRY 82, 83 (2008).

48. *See, e.g.*, Richard J. Bonnie, *Judicially Mandated Treatment with Naltrexone for Opiate-Addicted Criminal Offenders*, 13 VA. J. SOC. POL'Y & L. 64, 64 (2005).

from binding,[49] preventing a user from feeling the effects of ingested heroin or prescription painkillers and producing no subjective side effects on its own. The rationale behind its use is that a person on naltrexone will learn that opiate ingestion is pointless because they feel no effects from it, and thus curtail their use.[50] Persons receiving naltrexone must be fully detoxified from opiates before treatment can be started to avoid precipitating a dangerous withdrawal syndrome.[51]

In a rare study involving the criminal justice population, volunteer federal probationers or parolees with a history of opioid addiction participated in a naltrexone treatment experiment.[52] Among the subjects that completed the study, opioid use and rearrest rates were significantly lower in the group of subjects receiving oral naltrexone in addition to counseling during a six month period than in those receiving only counseling and monitoring.[53] In 2006, a long-lasting injectable form of naltrexone became available, and in a randomized, placebo-controlled study of volunteer opioid-dependent subjects it was found to extend retention time in an eight-week treatment program (when given at the beginning of the first and fifth weeks), but was without significant dose-responsive effects on the percentage of opioid-positive urine samples.[54] Nevertheless, the National Institute on Drug Abuse (NIDA)

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49. *Id.* at 67.

50. *Id.* at 68.

51. *See id.* at 67.

52. Federal regulations tightly control human subjects research with incarcerated populations because of ethical concerns about coercion and lack of autonomy or fully informed consent. *See generally* 45 C.F.R. § 46 (2012). While an important protection for prisoners following a sordid history of medical research abuses, this regulation (known as the "Common Rule") has the effect of substantially limiting biomedical research in prison, probationer, and parolee populations. While certain biological aspects of drug addiction therapy, such as the pharmacokinetics and side effect profiles, can be assessed in the general population with relative confidence about the generalizability of the results, behavioral and psychosocial aspects of such therapies may be distinct within criminal justice populations. Consequently, little is known about whether certain therapy effects would be similar or have significant differences if offered or mandated to a criminal justice population.

53. Subjects receiving naltrexone averaged 8% of positive opioid urine specimens, while control subjects averaged 30% positive. Twenty-six percent of subjects receiving naltrexone were re-incarcerated for probation violations, compared to 56% of control subjects. However, cocaine use among both groups was "high," and the study is confounded by the volunteer nature which may insert a bias for those willing and motivated to participate in drug treatment. Retention rates were 52% for the naltrexone group (n=37 completing the study) and 33% for the control group (n=17 completing the study). James W. Cornish et al., *Naltrexone Pharmacotherapy for Opioid Dependent Federal Probationers*, 14 J. SUBSTANCE ABUSE TREATMENT 529, 532-33 (1997).

54. Sandra D. Comer et al., *Injectable, Sustained-Release Naltrexone for the Treatment of Opioid Dependence*, 63 ARCHIVES GEN. PSYCHIATRY 210, 212 (2006) (finding no significant dose-related effects when results were recalculated without assumption that missing samples and participants would test positive); *see also* Sarah Teagle, NAT'L INST. OF

funded a five-site study of recently released parolees with a history of opioid addiction to be treated with either extended-release naltrexone or treatment as usual for six months.[55] Sixty-one opioid-dependent volunteers—all of whom were under legal supervision as a parolee, probationer, or in a diversionary program—received a series of monthly injections with extended-release naltrexone and then were followed for a six-month period.[56] Promisingly, those who completed the series of injections were more likely to complete the six-month follow up, had significantly fewer opioid-positive urines, and were less likely to have been incarcerated than those who had not completed treatment.[57] Despite the study's limitations, researchers concluded that extended-release naltrexone may be a "feasible and effective treatment option" for persons under legal supervision.[58]

In terms of treatment strategies, pharmacological therapies using substitution or antagonism strategies are akin to symptom control rather than curative measures. Persons taking substitution therapies generally do so for long periods of time (the "maintenance" phase), with gradual withdrawal attempted only under the guidance of a physician and treatment often resumed if the withdrawal consequences are intolerable and the patient can continue to afford the maintenance therapy. Antagonism strategies work only as long as the therapeutic drugs are present in a person's bloodstream and cerebrospinal fluid, and are basically an indirect route to behavioral modification by temporarily making the drug-taking experience ineffective or unpleasant and helping a motivated user break the cycle of drug seeking and taking. As legal scholar Richard Bonnie emphasizes, "naltrexone does not produce any lasting change in the patient's brain or personality"—a feature used to distinguish it from other court-mandated medical interventions such as chemical castration for sex offenders and anti-psychotic medication for the severely mentally ill.[59]

DRUG ABUSE, *Depot Naltrexone Appears Safe and Effective for Heroin Addiction,* 21 NIDA NOTES 7, 7 (2007), *available at* http://www.drugabuse.gov/sites/default/files/nnvol21n3.pdf (finding injectable form of naltrexone "performed well" in this pilot clinical study).

55. *See* Richard J. Bonnie, Donna T. Chen & Charles. P. O'Brien, *The Impact of Modern Neuroscience on Treatment of Parolees: Ethical Considerations in Using Pharmacology to Prevent Addiction Relapse,* THE DANA FOUND. (Nov. 25, 2008), http://www.dana.org/news/cerebrum/detail.aspx?id=13932; Donna M. Coviello et al., *A Multisite Pilot Study of Extended-Release Injectable Naltrexone Treatment for Previously Opioid-Dependent Parolees and Probationers*, 33 SUBSTANCE ABUSE 48 (2012).

56. Donna Coviello et al., *supra* note 55, at 53.

57. *Id.* at 55.

58. *Id.*

59. Bonnie, *supra* note 48, at 71.

Whether or not the brain-invasive nature of a treatment is critical for a legal and ethical analysis will be discussed in Part III.

Novel treatments coming from neuroscience research are fundamentally different from these currently-available strategies in one or more crucial respects: the duration of time they may last without an active drug in someone's system in the case of vaccines, and the attempted direct modification of the neural pathways of learning and memory hijacked by drugs of abuse and thought to be the fundamental problem precipitating relapse episodes, including those that occur even years after detoxification and abstinence. These therapies may be more efficacious and cost-effective, but are also more invasive of a person's biology and autonomy than drugs that may be discontinued at will. These heightened levels of effectiveness and invasiveness are what should trigger renewed scrutiny of the legal and administrative mechanisms by which such drugs are administered in any kind of criminal justice context, as discussed in Part III.

2. Blocking Drug Effects: Vaccines

Vaccination against drug addiction works on a similar principle to pharmacological antagonism therapies in that after the vaccine is administered and antibodies have been produced, the ingestion of the drug will have a reduced or no effect on the user. Both strategies attack or block the drug of abuse, rather than having restorative or protective effects on neural systems affected by the drug. In theory, the vaccinated user will cease to take the drug as he stops experiencing its pleasant effects.[60] Moreover, vaccines use the human immune system to block the ingested drug from getting into the brain where it has its subjectively rewarding effects, and as such, do not attempt to directly modify neural pathways or even occupy neural receptors. In this sense, vaccination is less directly invasive of a person's central nervous system than a therapy like naltrexone, which does get into the brain and works by chronically occupying receptors, although it does not modify the person's subjective experience or, presumably, have much effect on brain plasticity other than acting as a blockade to the drug of abuse. On the other hand, vaccination may be more biologically invasive because it is designed to trigger the production of antibodies that persist in one's bloodstream long after the dose is administered, making it physically impossible to undo the effects simply by stopping therapeutic dosing. Depending on the dosing schedule, a person receiving vaccination may have fewer decision points at which to

60. Kayt Sukel, *Cocaine Vaccine May Offer Alternative Therapy to Addicts*, THE DANA FOUND. (Jan. 4, 2010), http://www.dana.org/news/features/detail.aspx?id=24498.

exercise his autonomy and curtail or modify treatment, because the injection is designed to have long-lasting effects on the body's immune system.[61]

Clinical trials for a cocaine vaccine in development called TA-CD have reported mixed results and, at present, the vaccine is not approved for clinical therapeutic use.[62] The vaccine works by attaching cocaine molecules (too small for the immune system to normally respond to) to a large protein from the cholera bacterium.[63] The body's immune system then develops antibodies to both the bacterium and the cocaine molecules, such that after ingestion cocaine is attacked by the new antibodies and sequestered in the bloodstream before it reaches the brain.[64] Thus far, the TA-CD vaccine has been shown to require frequent initial dosing and "booster" shots to achieve effective levels of immunogenicity, and even then demonstrates highly variable rates of antibody production.[65] A randomized, double-blind, placebo controlled trial demonstrated that only 38% of subjects receiving the vaccination produced sufficient antibodies to significantly reduce cocaine usage as measured by urine samples for two months following dosing.[66] Of those who developed high levels of antibodies, 53% showed a 50% reduction in cocaine use, compared to 23% of those who developed low antibody levels, and a quarter of subjects failed to develop antibodies at all.[67] A recent study among non-treatment seeking cocaine-addicted volunteers showed that plasma antibody levels correlated with the reduction in the drug's subjective effects in the immediate minutes following ingestion.[68] The 2009 research report also indicated a potential major side effect of the vaccination strategy: "[s]ome of the addicts participating in a study of the vaccine started doing massive

61. Of course, a vaccine that needs to be given on a monthly "booster" basis, as the current version of the cocaine vaccine seems to require, may be fundamentally similar to a monthly depot injection of a drug like naltrexone in the duration of its effects and thus the number of decision-points at which a person can terminate or alter their treatment. *See, e.g.*, Phil Skolnick & Nora D. Volkow, *Addiction Therapeutics: Obstacles and Opportunities*, 72 BIOLOGICAL PSYCHIATRY 890, 891 (2012).

62. Bridget A. Martell et al., *Vaccine Pharmacotherapy for the Treatment of Cocaine Dependence,* 58 BIOLOGICAL PSYCHIATRY 158, 158 (2005).

63. *See id.*

64. *See id.*

65. *Id.* at 162; *see also* Laurent Karila et al., *New Treatments for Cocaine Dependence: A Focused Review*, 11 INT'L J. NEUROPSYCHOPHARMACOLOGY 425 (2008).

66. Bridget A. Martell et al., *Cocaine Vaccine for the Treatment of Cocaine Dependence in Methadone-Maintained Patients: A Randomized, Double-Blind, Placebo-Controlled Efficacy Trial*, 66 ARCHIVES GEN. PSYCHIATRY 1116, 1116 (2009).

67. *Id.*

68. Margaret Haney et al., *Cocaine-Specific Antibodies Blunt the Subjective Effect of Smoked Cocaine in Humans*, 67 BIOLOGICAL PSYCHIATRY 59, 59 (2010).

amounts of cocaine in hopes of overcoming its effects," and blood tests of these participants reported up to ten times more cocaine after vaccination than was found in pre-vaccine urine samples.[69] Not only is this type of outcome ineffective (and in fact the exact opposite of the desired result) in terms of behavioral control, but also presents a serious danger of overdose and death from systemic cocaine effects, such as elevated heart rate and cardiac arrest. Researchers and pharmaceutical companies are still pursuing vaccine development with the goal of achieving versions that require less frequent dosing and have more effective immunogenic profiles in a larger proportion of a treated population.[70] Similar vaccines are also under development for nicotine[71], heroin[72], and methamphetamine[73], and optimism abounds at leading federal research institutions for their availability within the next decade.[74]

3. Actual Treatment: Direct Modification of Drug-Related Conditioned Associations

A final example of future neuroscience-based therapies for drug addiction has not yet been discussed in the legal literature. Research and development is in very early stages of human subject experimentation. Scientists are exploring direct modification of the powerful memories created when drugs hijack normal learning and memory systems, with the therapeutic goal of effectively rewiring such pathways so that the drug-related conditioned associations no longer exert such a powerful grip on behavioral responses by stimulating craving and drug-seeking.[75]

The underlying neural phenomenon, known as "reconsolidation," is a process by which associations are strengthened or diminished via modifications of intracellular signaling mechanisms and synaptic

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69. Rachel Saslow, *Testing of Cocaine Vaccine Shows it Does Not Fully Blunt Cravings for the Drug*, WASH. POST (Jan. 5, 2010), http://www.washingtonpost.com/wp-dyn/content/article/2010/01/04/AR2010010402752.html.

70. *Id.*

71. Xinyuan Chen et al., *High Immunogenicity of Nicotine Vaccines Obtained by Intradermal Delivery with Safe Adjuvants*, 31 VACCINE 154 (2012).

72. Paul T. Bremer & Kim D. Janda, *Investigating the Effects of a Hydrolytically Stable Hapten and a Th1 Adjuvant on Heroin Vaccine Performance*, 55 J. MED. CHEM. 10776 (2012).

73. Michelle L. Miller et al., *A Methamphetamine Vaccine Attenuated Methamphetamine-Induced Disruptions in Thermoregulation and Activity in Rats*, 73 BIOLOGICAL PSYCHIATRY 721 (2013).

74. Hilary Hylton, *A Drug to End Drug Addiction*, TIME (Jan. 9 2008), http://www.time.com/time/health/article/0,8599,1701864,00.html.

75. *Id.*

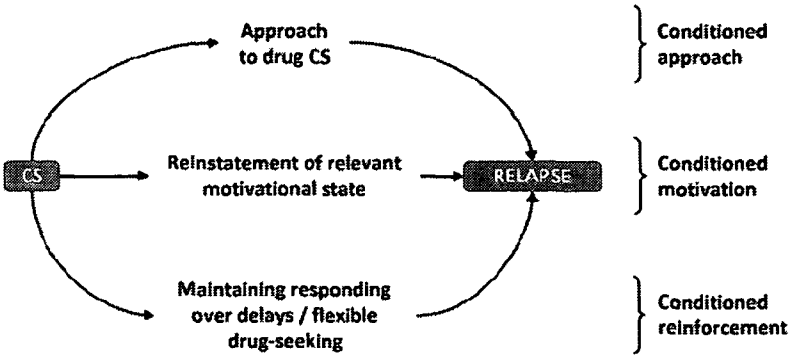
(neuron-to-neuron) connective efficiency. Reconsolidation is "the process by which memories, destabilized at retrieval, require restabilization to persist in the brain."[76] This restabilization requirement presents a therapeutic target for disruption by interfering with the cellular-level processes of gene expression and protein transcription that appear to be necessary for the cementing process after destabilization.[77] Rather than being limited to recent memories, reconsolidation seems to happen to even old, well-established, and fundamental memory processes, particularly Pavlovian-type conditioning mechanisms known to be critical to the development of compulsive drug-seeking and taking behavior.[78] Milton and Everitt present a model for therapeutic intervention based on "three routes to relapse," targeting the effects that drugs of abuse have on Pavlovian conditioning systems of conditioned reinforcement, conditioned approach, and conditioned motivation.[79]

76. *See* Amy L. Milton & Barry J. Everitt, *The Psychological and Neurochemical Mechanisms of Drug Memory Reconsolidation: Implications for the Treatment of Addiction*, 31 EUR. J. NEUROSCI. 2308, 2308 (2010), for a review summarizing the animal literature. *See also* Jane R. Taylor, Peter Olausson, Jennifer J. Quinn & Mary M. Torregrossa, *Targeting Extinction and Reconsolidation Mechanisms to Combat the Impact of Drug Cues on Addiction*, 56 NEUROPHARMACOLOGY, (Supp. 1), 186 (2009).

77. Jonathan L.C. Lee, Barry J. Everitt & Kerrie L. Thomas, *Independent Cellular Processes for Hippocampal Memory Consolidation and Reconsolidation*, 304 SCI. 839, 843 (2004); Jonathan L.C. Lee et al., *Disrupting Reconsolidation of Drug Memories Reduces Cocaine Seeking Behavior*, 47 NEURON 795 (2005); Jonathan L.C. Lee, Amy L. Milton & Barry J. Everitt, *Cue-Induced Cocaine Seeking and Relapse are Reduced by Disruption of Drug Memory Reconsolidation*, 26 J. NEUROSCI. 5581 (2006).

78. Milton & Everitt, *supra* note 76.

79. *Id.* at 2312, Figure 4. "CS" means "conditioned stimulus," which refers to a cue that the animal has come to associate with drug availability. In the real world, any number of things may serve as a conditioned stimulus for addicts: a person, place, or thing or even sensations such as particular smells, tastes, and emotions may become associated with drug-seeking and taking behavior.



"The 'three routes to relapse' produced by the effects of [P]avlovian drug-associated conditioned stimuli over instrumental drug-seeking and relapse behaviour [sic]."[80]

Each route is neurally dissociable from the others and has the potential to modulate the likelihood of drug-seeking relapse triggered by various conditioned stimuli present in the user's environment.[81] Milton and Everitt emphasize that while such dissociable mechanisms increase understanding of the neural pathways of addiction in highly-controlled laboratory animals, real-life addiction therapies should attempt to target all three to be most effective against the complex psychological aspects of addiction subserved by each system.[82] Several pharmacological strategies are being explored that target reconsolidation mechanisms, such as direct administration of protein kinase inhibitors and targeting of specific glutamatergic neurotransmitter receptors that modulate intracellular gene expression and protein synthesis.[83] Reconsolidation strategies have found other therapeutic targets and early successes in pharmacological and behavioral treatments for post-traumatic stress disorder.[84]

Remarkably, recent work in humans has applied purely behavioral approaches to reconsolidation, without the use of pharmacological

80. *Id.* at 2312.

81. *Id.* at 2308.

82. *Id.* at 2314.

83. *Id.*

84. *See, e.g.*, Alain Brunet et al., *Effect of Post-Retrieval Propranolol on Psychophysiologic Responding During Subsequent Script-Driven Traumatic Imagery in Post-Traumatic Stress Disorder*, 42 J. PSYCHIATRY. RES. 503, 505-06 (2008); Merel Kindt, Marieke Soeter & Bram Vervliet, *Beyond Extinction: Erasing Human Fear Responses and Preventing the Return of Fear*, 12 NATURE NEUROSCI. 256, 257-28 (2009); Daniela Schiller et al., *Preventing the Return of Fear in Humans Using Reconsolidation Update Mechanisms*, 463 NATURE 49, 52 (2010), *available at* http://www.nature.com/nature/journal/v463/n7277/full/nature08637.html.

interference.[85] This study applied a behavioral approach used in animals called the "memory retrieval-extinction" procedure, which takes advantage of a narrow window of time in which "reactivated" memories seem to be labile, such that behavioral interference prevents their reconsolidation.[86] In a population of in-patient detoxified heroin addicts, the procedure using a 10-minute delay reduced heroin cue-induced craving (measured by self-report) and cue-induced blood pressure, as compared to the same procedure using a 6-hour delay.[87] This effect persisted even up to 184 days beyond the treatment session.[88] Clearly further work is needed, but the promise of a purely behavioral, non-pharmacological approach to treating addiction is an exciting prospect, and one that does not present many of the concerns outlined below in Parts II and III. Whether or not robust clinical development of such a treatment takes place without the financial incentives present for pharmacological therapies remains to be seen.[89]

Targeting reconsolidation mechanisms as a "pro-abstinence, anti-relapse" treatment for drug abuse may offer the first direct approach to manipulate the root neurobiological cause of persistent drug-seeking and taking behaviors. Rather than symptom treatment or antagonism of the drug itself, direct neural modification of drug-related memories promises to come closest to a "cure" by re-wiring the hijacked neural mechanisms that can otherwise lead to such profound reshaping of behavior such that relapse is considered all but inevitable. The benefits to such an approach are obvious:

> [T]reatments based upon the disruption of reconsolidation would be predicted to require few, and possibly even a single, treatment with a memory-disrupting drug in order to increase the likelihood of long-lasting abstinence from drugs of abuse. This would clearly be advantageous in avoiding the compliance and tolerance issues associated with more extended, prophylactic anti-relapse treatments.[90]

The challenges of this approach, however, may be equally profound. The learning and memory systems hijacked by drugs of abuse are core elements of all learned behavior. Manipulating drug-based memories in

85. Yan-Xue Xue et al., *A Memory Retrieval-Extinction Procedure to Prevent Drug Craving and Relapse*, 336 SCIENCE 241 (2012).

86. Amy L. Milton & Barry J. Everitt, *Wiping Drug Memories*, 336 SCIENCE 167 (2012).

87. Xue et al., *supra* note 85, at 243.

88. *Id.*

89. *See, e.g.*, Skolnick & Volkow, *supra* note 61.

90. Milton & Everitt, *supra* note 76, at 2316.

dynamic social and complex organisms may come with serious side-effects, such as significant changes in memories, personality, or even sense of personal identity. Early cross-species behavioral studies in humans, such as the Xue paper cited above, provide a sense of optimism that such therapies could be both highly targeted and minimally or non-invasive. Animal research in drug addiction should be closely watched by the therapeutic jurisprudence community, as the behavioral models used to study addiction are extremely sophisticated and designed to have maximum translational value. Therapies that directly modify, diminish, or erase drug-related memories are in the research and development pipeline and represent a significant shift in therapeutic strategy that attempts to capitalize on a detailed understanding of the neural mechanisms underlying drug addiction.

II. IMPACT OF NOVEL TECHNIQUES AND THERAPIES FROM NEUROSCIENCE ON THE CURRENT CRIMINAL JUSTICE SYSTEM: TREATMENT ADMINISTRATION THROUGH DRUG AND PROBLEM-SOLVING COURTS

Novel therapies from neuroscience are likely to have the most substantial impact on the criminal justice system by expanding the range of rehabilitative strategies available to sentencing or diversionary programs. In particular, drug and problem-solving courts may prove to be a major point of entry for such therapies into the criminal justice system, given these courts' flexibility and creativity with respect to adopting intensive monitoring and treatment programs with motivated offenders.[91]

91. In 1997, the National Association of Drug Court Professionals and the U.S. Department of Justice's Office of Justice Programs published the ten "key components" of drug courts, which serve as the defining elements of drug courts and offers performance benchmarks to guide implementation. BUREAU OF JUSTICE ASSISTANCE, U.S. DEP'T OF JUSTICE, NCJ 205621, DEFINING DRUG COURTS: THE KEY COMPONENTS (reprt. 2004) (Jan. 1997). The ten key components are:

- Integration of substance abuse treatment with justice system case processing.
- Use of a nonadversarial approach, in which prosecution and defense promote public safety with protecting the right of the accused to due process.
- Early identification and prompt placement of eligible participants.
- Access to a continuum of treatment, rehabilitation, and related services.
- Frequent testing for alcohol and illicit drugs.
- A coordinated strategy among the judge, prosecution, defense, and treatment providers to govern offender compliance.
- Ongoing judicial interaction with each participant.
- Monitoring and evaluation to measure achievement of program goals and gauge effectiveness.

Drug courts have been called the "the most significant penal innovation in the last twenty years."[92] Drug courts have proliferated since their inception in 1989, and have "received almost uniformly positive media coverage and overwhelming support at both the national and local levels."[93] Much has been written about how drug courts work, which will not be repeated here other than to refer the reader to materials cited herein, where detailed background information is available. Broadly speaking, drug courts exist alongside the normal penal system, and eligible offenders are given the choice to participate in lieu of traditional adjudication. Some courts are deferred-prosecution, while others operate post conviction, after an offender pleads guilty in exchange for a deferred sentence pending successful participation in the drug court.[94] As discussed below, different courts use different eligibility criteria: being an "addict," having no or no violent prior offenses, and not participating in a gang are some of the set of criteria drug courts employ.[95] Once accepted, participants are required to complete the treatment regime overseen by a judge, with in-court status meetings, random drug tests, rewards and sanctions, and other "assignments" seemingly limited only by the court's creativity.[96] Programs typically last 12-18 months.[97]

This section outlines the structure of a cost-benefit analysis of integrating such therapies into the current criminal justice system via drug courts, and particularly considers the implications for currently used modalities for drug treatment. This analysis is an illustrative framework rather than proscriptive. Part III explains why a thorough policy consideration of how to incorporate novel treatments from neuroscience into the criminal justice system must go beyond the analytical framework presented in this section, towards a fuller discussion of fundamental principles and procedures of drug courts or other criminal justice policy mechanisms.

- Continuing interdisciplinary education to promote effective planning, implementation, and operation.
- Partnerships with public agencies and community-based organizations to generate local support and enhance drug court effectiveness.

92. Eric J. Miller, *Embracing Addiction: Drug Courts and the False Problem of Judicial Interventionism*, 65 OHIO ST. L.J. 1479, 1481 (2004).

93. JAMES L. NOLAN, JR., REINVENTING JUSTICE: THE AMERICAN DRUG COURT MOVEMENT 5 (2001). Doug Husak "see[s] little in the media since the publication of Nolan's book to change this verdict about the level of public support for the drug court movement." Husak, *supra* note 4, at 230, n.4.

94. *See* Husak, *supra* note 4.

95. *Id.*

96. *See* HUDDLESTON & MARLOWE, *supra* note 3, at 7.

97. *Id.*

A. Potential Benefits: Improved Effectiveness Above and Beyond Current Court-Ordered Drug Treatment Programs?

Two variables critical for assessing how novel therapeutic options might impact success rates vary widely amongst drug courts. These two major variables are (1) the treatment modalities used and (2) participant acceptance criteria. Indeed, one commentator has noted that "drug courts differ so much that generalizations are perilous."[98] Few meaningful empirical assessments can be made about the effectiveness of particular program elements without these baselines.

With respect to the treatment program variable, a comprehensive review of the empirical drug court literature concluded that "[f]ew evaluations have provided analysis on how the modality of treatment that drug court participants receive impacts their rates of success."[99] Typically, courts partner with community-based programs licensed by the state to provide substance abuse treatment services that tend to rely heavily on behaviorally-centered programs including counseling, twelve-step programs such as Narcotics Anonymous, and, to a lesser extent, structured cognitive behavioral therapy.[100] Treatment services are used in as part of the integrated drug court program, in conjunction with judicial monitoring, frequent drug testing, and delivery of rewards and sanctions in the courtroom.[101] Lack of quality assurance of treatment service providers has been a concern echoed in the drug court policy literature.[102] This concern was cited by the National Institute of Justice as the major implication of a comprehensive study assessing the efficacy of treatment modalities:

> [T]he research identifies deficiencies and problems in the way that treatment programs are delivered and suggests that drug courts may actually be shortchanging their clients in important respects . . . improvements are clearly needed in treatment content, access, and

98. Husak, *supra* note 4, at 217.

99. RYAN S. KING & JILL PASQUARELLA, THE SENTENCING PROJECT, *Drug Courts: A Review of the Evidence* (2009), *available at* http://www.sentencingproject.org/doc/dp_drugcourts.pdf.

100. *See* BUREAU OF JUSTICE ASSISTANCE, *supra* note 91.

101. *See id.*

102. Faith E. Lutze & Jacqueline G. van Wormer, *The Nexus Between Drug and Alcohol Treatment Program Integrity and Drug Court Effectiveness: Policy Recommendations for Pursuing Success*, 18 CRIM. J. POL'Y R. 226, 227 (2007) ("Although process evaluations have described the extent to which [the integration of alcohol and other drug treatment services within justice system case processing] has been successfully implemented . . . and most note the importance of treatment integrity to the process, few have actually attempted to measure the quality of the treatment provided to drug court participants and the impact that this may have on outcomes ....") (internal citations omitted).

> delivery; program integration; and program integrity so that drug courts can increase retention rates and achieve longer term reductions in drug use and criminal activity.[103]

The second variable, participant eligibility and acceptance criteria, is also a critical but missing piece of data for an empirical analysis of how novel therapies from neuroscience might improve the efficacy of drug-court mandated treatments. While "[e]arly identification and prompt placement of eligible participants"[104] is one of the key components of a drug court, the assessment methods and acceptance criteria vary substantially between courts.[105] Even setting aside legal status elements of drug court enrollment criteria (such as no prior felonies, charges of drug dealing, or violent offenses) some commentators have criticized drug courts for "skimming" participants who do not, in fact, have serious addiction problems and for whom any "treatment" program is likely to succeed.[106] For such participants, it seems possible that enhanced therapies from neuroscience may offer no marginal benefit. On the other hand, for participants with serious drug addiction problems, the medically-intensive pharmaceutical, vaccination, or drug-memory modification therapies discussed above may boost the effectiveness of counseling, monitoring, and twelve-step programs. Thus, adoption of such therapies may permit or even require drug courts to admit participants with more serious problems who could derive the greatest marginal benefits from such treatments as a matter of economic efficiency.

With respect to their primary outcome measures, drug courts have proven to be effective at reducing criminal recidivism and cost-effective in their use of criminal justice system resources.[107] Measuring recidivism,

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103. NAT'L INST. OF JUSTICE, U.S. DEPT. OF JUSTICE, DRUG COURTS: THE SECOND DECADE, 20 (2006) (reporting on findings from Anspach & Ferguson, *supra* note 37), *available at* https://www.ncjrs.gov/pdffiles1/nij/211081.pdf.

104. NAT'L INST. OF JUSTICE, *supra* note 103, at 3.

105. *Id.* at 5.

106. NAT'L ASS'N OF CRIM. DEF. LAW., AMERICA'S PROBLEM-SOLVING COURTS: THE CRIMINAL COSTS OF TREATMENT AND THE CASE FOR REFORM 12 (2009); *see also* Miller, *supra* note 92, at 1541-42.

107. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-05-219, ADULT DRUG COURTS: EVIDENCE INDICATES RECIDIVISM REDUCTIONS AND MIXED RESULTS FOR OTHER OUTCOMES 44, 72 (2005); *see also* 2 C. WEST HUDDLESTON, III, DOUGLAS E. MARLOWE & RACHEL CASEBOLT, NAT'L DRUG COURT INST., PAINTING THE CURRENT PICTURE: A NATIONAL REPORT CARD ON DRUG COURTS AND OTHER PROBLEM-SOLVING COURTS IN THE UNITED STATES 6-7 (2008) (reporting substantial net cost saving per participant ranging from around $4,700 in Washington State drug courts to over $12,000 in a single court in Multnomah County, Oregon); HUDDLESTON & MARLOWE, *supra* note 3, at 9-10 (reporting savings to the criminal justice system of $2.21 to $3.36 for every $1.00 invested, with greater savings achieved when targeted at higher risk offenders).

however, does not necessarily capture the public health aspect of drug use. With respect to actually reducing participants' substance use, the limited data available on relapse rates (from only eight courts out of the twenty-seven surveyed by the GAO report) has shown mixed results, with modest reductions in use shown by drug test results contradicted by participants' self-reported data.[108]

Which measure is considered to be more salient as an outcome for policy analysis depends in part on the purpose and goals of the drug court system. As part of the criminal justice system, the outcome measure more salient for evaluating drug courts' overall effectiveness is the reduction in a participant's interactions with the system: reduced recidivism. From both a criminal justice *and* a public health and safety perspective, however, it is arguable that reduction in drug use—reduced relapse—is a more desirable outcome measure because it captures both improved health consequences *and* concomitant reductions in illegal activity (drug purchase, sale, and possession) that could land a participant back in custody. Thus, improvements in treatment options provided by advances in neuroscience that have the direct outcome of reducing drug use could conceivably enhance *both* outcome measures. Indeed, implementation of more intense medical procedures as part of treatment modalities should stimulate more drug courts to collect data on substance use rates and set benchmarks for relapse reductions as a primary goal, with the justification that reduction in drug use is an outcome measure of effectiveness that captures all of the goals of drug court rehabilitative programs. If drug courts are currently effective (both statistically, as compared to the traditional criminal justice model, and from a cost perspective) at reducing recidivism but not at reducing actual substance use, it is conceivable that improvement of treatment modalities via novel therapies from neuroscience could only further improve outcomes by supporting reductions in relapse rates.

B. Potential Costs: Conflict With Current Treatment Systems and Overuse of Medically Intensive Resources in the Courtroom

Adopting novel therapies from neuroscience into treatment programs used by drug courts would not be without substantial challenges. First and foremost, the therapies must be proven to be safe and effective, with side effect and risk profiles that are tolerable for participants. Beyond basic safety measures, however, the implementation of highly medicalized treatment modalities into a system that relies heavily on in-court monitoring and programs using therapies informed by different

108. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 107, at 60.

philosophies of drug addiction may create conflict within an individual's treatment regimen that reduces overall efficacy. For example, the National Institute of Justice sponsored a review of treatment delivery services in four drug courts and found that programs using multiple approaches to treatment simultaneously "lacked coherence and were based on incompatible philosophies," resulting in "messages to participants [that] were often inconsistent."[109] As an example of incompatible treatment philosophies with opposing theories of the etiology of drug abuse, drug court participants may participate in a twelve-step program, "which advocates that participants recognize they lack the strength or resources to control their addiction and turn their lives over to a higher power," while simultaneously receiving cognitive behavioral therapy, which "requires participants to recognize and examine the role played by thoughts and emotions in perpetuating addictive behavior and take control of internal processes by learning new social, emotional, and cognitive skills."[110] Therapies coming from neuroscience research may be perceived by participants as rooted in a medicalized philosophy of a neurobiological basis of addiction, particularly the "addiction as a brain disease" etiological theory of drug abuse.[111] This approach may prove to be incompatible with either the twelve-step program or a cognitive behavioral therapy program, depending in part on how a participant perceives their own agency to be affected by a behaviorally-manifesting "brain disease" and the extent to which supportive services demand that a participant exercise that agency.[112] It is not known how therapies like pharmacological treatment, vaccines, and selective memory modification would work within a holistic treatment program. It seems possible, however, that incompatible or contradictory philosophies about drug abuse etiology and recovery could impede compliance and treatment effectiveness.

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109. NAT'L INST. OF JUSTICE, *supra* note 103, at 15-16.

110. *Id.* at 16.

111. Alan I. Leshner, *Addiction is a Brain Disease, and it Matters,* 278 SCI. 47 (1997). Dr. Leshner, CEO of the American Association for the Advancement of Science and former director of the National Institute on Drug Abuse, argues "[Addiction] is a brain disease for which the social contexts in which it has both developed and is expressed are critically important. . . . Understanding addiction as a brain disease explains in part why historic policy strategies focusing solely on the social or criminal justice aspects of drug use and addiction have been unsuccessful. They are missing at least half of the issue. If the brain is the core of the problem, attending to the brain needs to be a core part of the solution." *Id.* at 46-47.

112. *See generally* NAT'L INST. ON DRUG ABUSE, PRINCIPLES OF DRUG ABUSE TREATMENT FOR CRIM. JUSTICE POPULATIONS (rev. ed. 2012) (2006) (proposing a coherent theoretical model for a drug court employing neuroscience-derived therapeutic measures), *available at* www.drugabuse.gov/PODAT_CJ/principles.

While neuroscience-based therapeutic advances may help treat more serious cases of substance abuse, they will also come with increased costs for the treatments themselves and for expanded medical staff to deliver them as part of court-mandated treatment programs. At present, behavioral therapies in treatment programs can be administered by counselors who may not be extensively educated or professionally licensed.[113] In the future, any pharmacological or vaccine-based treatment, such as those forecasted above, will be an FDA-regulated drug or device that must be administered by clinically-trained staff who thoroughly understand the appropriate use, contraindications, and related risks and side effects. At present, narcotics treatment programs using substitution or aversion therapies as described above are licensed and regulated by state and federal law, and overseen by a licensed medical doctor.[114] In addition to the costs of novel drugs and devices patented and marketed by pharmaceutical companies, the costs of maintaining highly-trained clinical staff to prescribe the administration of novel therapies may substantially change the cost-effective balance of current drug court programs. Some costs may be offset by raising program fees levied on drug court participants, including perhaps making certain therapies available on the basis of ability to pay for a substantial portion of the treatment. At the same time, new and more expensive therapies may reveal the limits of drug court economic viability. For example, funding ceilings that limit the outlays drug courts can make for treatment may not be high enough to permit the investment needed to capture back-end benefits of such significant reductions in relapse and recidivism with more seriously affected participants. Moreover, such therapies may provide only incremental effectiveness, and without concurrent screening programs to predict the likelihood of a given outcome for an individual (at an additional cost), there is the potential for significant waste of expensive medical and court resources on ineffective or only marginally effective treatments.

The areas of cost-benefit analysis described above are just some of the major analyses that would have to be informed by empirical data on safety, effectiveness, and costs before novel therapies from neuroscience should be adopted into current drug court practices.

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113. NAT'L INST. OF JUSTICE, *supra* note 103, at 14. *See also* Lutze & van Wormer, *supra* note 102, at 236 ("[I]t is well known that drug and alcohol treatment staff members are often underpaid, lack a college education or certification related to the treatments that they provide, receive no healthcare benefits, and receive minimal in-service training opportunities.").

114. *See, e.g.*, *Cal. Dep't of Alcohol & Drug Programs, Frequently Asked Questions*, CA.GOV, http://www.adp.ca.gov/Licensing/faqs.shtml (last visited Sep. 2, 2012) (describing the various licensing requirements for both public and private alcohol and drug treatment providers).

III. PARADIGM SHIFTS: RE-EXAMINING FUNDAMENTAL PRINCIPLES OF PROBLEM-SOLVING COURTS AND THERAPEUTIC JURISPRUDENCE

Rather than simply be shoehorned into existing practice models, novel therapies from neuroscience that treat drug addiction should force a deeper examination of the purposes, principles, and procedures used in drug and problem-solving courts. There are two categories of pragmatic reasons behind this: those deriving from institutional issues, and those deriving from the scientific differences in forthcoming treatments that raise questions of the appropriateness of deploying complex, medically invasive procedures within a criminal justice context of leveraged treatment. These types of issues interact in ways that necessitate a broader, top-down discussion of how the entire system should be organized. Without such a discussion, such scientific advances risk being misused as panaceas for other institutional problems, with potentially dire consequences that might undermine the entire system.[115] Moreover, the prospect of "curing" addiction through public health measures delivered in the shadow of the criminal justice system risks foreclosing a debate about that which ties the two together: drug criminalization.[116]

Criminologists Lutze and van Wormer foreshadowed the difficulties of adopting complex new technologies as part of attempts to reform offender treatment and corrections programs by looking back at historical changes in rehabilitative approaches adopted by enthusiastic and well-meaning reformers.[117] "Change often resulted in what was convenient to the existing institutions and their practices resulting in the abandonment of the components of the innovation that were too complex or required an expertise beyond the capabilities of the implementers."[118] This analysis seems particularly prescient with respect to complex technologies such as brain-based predictive measures and vaccines, or memory-modification to treat problematic behavior. Despite their sophistication, none of these

115. *See, e.g.*, Lutze & van Wormer, *supra* note 102, at 230 ("[T]he court needs to assure that the process and programs that offenders participate in are accessible, relevant, and of quality—if not, then both the court and the defendant and are likely to fail . . . .[T]he theory and mission underlying the program must be implemented in a way that produces the intended outcomes.").

116. Doug Husak has hit on the same point via an examination of the political and philosophical justifications for drug courts: "[Drug c]ourts would have no opportunity to dispense therapeutic justice to offenders unless drug use (or, more technically, drug possession) were proscribed throughout the United States. The jurisdiction of these courts presupposes the commission of a crime. Hence, the deepest question—rarely mentinoed in the literature about the drug court movement—is that of criminalization. If drug use were not a criminal offense, drug courts would not exist." Husak, *supra* note 4, at 219.

117. Lutze & van Wormer, *supra* note 102, at 230.

118. *Id.* at 227-28.

technologies may be expected to work as a magic bullet for the complex psychosocial, cultural, economic, and other factors that precipitate and sustain antisocial behavior such as drug addiction, and all will require careful integration with other support mechanisms that are the key components of drug courts. Moreover, such technologies will require advanced medical expertise and a theoretically coherent integrated treatment paradigm, as half-measures with invasive procedures hold the potential for more severe collateral consequences for a participant. Beyond the analysis in Part II, the complexity of the treatments should prompt drug courts to take a critical look at their institutional competencies as a biobehavioral medical services provider, and whether the entire treatment and monitoring program must be adjusted to incorporate neuroscientific understandings of the causes and consequences of substance abuse.[119]

The analysis, however, must go even further. Rather than only asking how neuroscience technologies could be effectively integrated into drug courts—indeed a complex question in and of itself—the potential risks and benefits promised by new technologies should shift the essential question to: are drug courts the right way to tackle the problem?

The beginning of the answer to that question must be a disaggregation of "the problem." Drug courts treat substance use and addiction as a criminal justice problem *and* a public health problem. Previous commentators have criticized drug and other problem-solving courts as a political panacea to deeper, under-examined problems of drug criminalization law, and moreover assert that such courts step beyond their limited jurisdiction and institutional competency into realms of medical treatment. These concerns are reignited and perhaps enhanced by technologies that may be invasive to the point of undue infringements on personal liberty and autonomy, which in turn raises questions about the protective legal mechanisms of due process and separation of powers.

The terrain is a confusing mix of theoretical, doctrinal, practical, and normative issues. Each of these domains will be discussed below as relatively discrete topics, though with overlapping concerns: the legal and ethical issues in leveraged treatment paradigms, the implications of unprecedented biological invasions on autonomy and personal liberty, and the appropriateness and effectiveness of a "therapeutic jurisprudence" doctrinal justification for drug courts in the face of expanded demands and capabilities. None of these problems has a satisfactory resolution, and thus raises the ultimate question: if new technologies might effectively treat a

119. For a thorough discussion of the theoretical incoherence of drug courts, in terms of treating addiction as a disease but participants as responsible agents receptive to external incentives, *see* Josh Bowers, *Contraindicated Drug Courts*, 55 UCLA L. REV. 783 (2008).

biobehavioral public health problem but cannot do so effectively within a criminal justice apparatus, is the mixed criminal justice/public health approach still appropriate? Some may consider it ironic that advances in addiction therapies once again raise the question of drug criminalization policy, but this is exactly the root of all the complex issues discussed in this section.

A. Legal and Ethical Issues in Leveraged Treatment Paradigms: A Starting Point

Drug courts operate on an opt-in, voluntary basis for those offenders who meet eligibility criteria; offenders can choose to have their case processed through the normal adversarial system and typical incarceration punishment if they do not want to agree to the contractual terms of drug court participation. An unassailable legal principle at work in this context is that every competent individual has a right to refuse unwanted medical treatment, and this right may only be overridden if it serves crucial government interests.[120] This principle mirrors the ethical commitment to personal autonomy and informed consent set forth in the Belmont Report, a seminal 1979 publication that set the modern standards in medical ethics that guide public health regulations.[121]

Several legal and policy scholars have explored the terrain of leveraged treatment for addiction that serves as a starting point for thinking about advanced therapies from neuroscience such as those discussed in Part I. Court-mandated, involuntary treatment with medically invasive therapies for convicted offenders, even as a condition of probation or parole, must overcome a strong showing of necessity (based on a crucial state interest) and effectiveness to be constitutionally permissible.[122] Voluntary arrangements, where accused or convicted offenders may choose to accept available treatment, pose fewer legal problems. Leveraged agreements, particularly those taking the form of contractual arrangements using the threat of criminal prosecution or incarceration as an incentive, venture into the gray area of coercion versus informed choice and consent. Drug courts have delicately straddled this boundary by providing treatments and

120. Bonnie, *supra* note 48, at 73. *See* Cruzan v. Dir. Mo. Dep't. of Health, 497 U.S. 210 (1990), for Supreme Court precedent regarding the right to refuse medical treatment.

121. NAT'L COMM'N FOR THE PROT. OF BIOMEDICAL & BEHAVIORAL RESEARCH, DEP'T OF HEALTH, EDUC. & WELFARE, PUB. NOS. 78-0013 & 78-0014, THE BELMONT REPORT: ETHICAL PRINCIPLES AND GUIDELINES FOR THE PROTECTION OF HUMAN SUBJECTS OF RESEARCH (1979), *available at* http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html.

122. Bonnie, *supra* note 48, at 78.

services on a contractual basis. Under these contracts, lapses in the participant's voluntary compliance with conditions are sanctioned with jail, or even termination of drug court participation and reversion to traditional prosecution or serving a deferred sentence, depending on the procedural model of the court.

Legal scholar Richard Bonnie has explored how the opiate antagonist naltrexone could be offered to addicted offenders in a leveraged-treatment paradigm involving plea or parole agreements that do not unconstitutionally coerce because they expand a defendant's available options (accept treatment or go to jail) rather than constricting them.[123] Even if such options are presented as choices, however, "policy makers have an obligation to look behind consents to make sure that addicted individuals are fully informed of the risks and benefits [of vaccines for addiction] . . . particularly in coercive environments, it will be important to insure that informed consent procedures are more than a legal hurdle surmounted by a consent form."[124] The National Association of Criminal Defense Lawyers recently published an extensive commentary on drug courts, focusing particularly on due process concerns raised by differences in procedural models (such as pre- or post-plea and adjudication distinctions) that may require defendants to waive important constitutional rights to be accepted into a drug court without enough time or information to make a fully informed decision.[125] When invasive therapies are simply added to the arsenal that drug treatment courts may offer to or wield over a defendant, the need for procedural protections grows in direct proportion to the potential consequences for medically significant outcomes and undue burdens on a person's bodily integrity or decisional autonomy.

B. Advanced Biological Invasions on Autonomy and Personal Liberty: Differences in Kind or in Degree?

There are no clear bright-line legal rules or principles as to what types of medical treatments, administered in what types of legal contexts, constitute impermissible intrusions upon a person's autonomy and personal

123. Bonnie, *supra* note 48, at 81-83 (resting discussion on the holding in Brady v. United States, 397 U.S. 742, 751 (1970), where the Supreme Court held that plea agreements are not unconstitutionally compelled "whenever motivated by the defendant's desire to accept the certainty or probability of a lesser penalty rather than face a wider range of possibilities extending from acquittal to conviction and a higher penalty authorized by law for the crime charged.").

124. M. Susan Ridgely & Martin Y. Iguchi, *Coercive Use of Vaccines Against Drug Addiction: Is it Permissible and is it Good Public Policy?*, 12 VA. J. SOC. POL'Y & L. 260, 328 (2004).

125. NAT'L ASS'N OF CRIM. DEF. LAW., *supra* note 106.

liberty, other than the occasional extreme example of a procedure that "shocks the conscience."[126] After all, all conditions imposed by plea agreements or behavioral contracts put restrictions on a person's liberty and autonomy, and convicted offenders lose their liberty and some degrees of autonomy as part of their punishment. Furthermore, all punishments such as incarceration restrict a person's bodily autonomy and undoubtedly have experiential effects on brain plasticity. As Professor Hank Greely has noted:

> I see no qualitative difference between acting directly to change a criminal's brain . . . through drugs, surgery . . . or vaccines, if proven safe and effective[—]and acting indirectly[—]through punishment, rehabilitation, cognitive therapy, parole conditions[—]to achieve similar ends. It is true that we understand better the likely effects of the traditional methods of trying to change criminals' behavior, including their strong likelihood of failure. Ignorance of a direct intervention's safety and efficacy would certainly be an important strike against its use, but if the intervention is proven safe and effective (again, to whatever standards one applies), direct and indirect interventions seem to me not importantly different.[127]

At present, it is unclear whether the direct or indirect nature of a court-mandated or court-supplied intervention matters in terms of any clear legal and ethical principles. Indeed, even the terms "direct" and "indirect" are unclear as to what causal pathway or point on a given pathway they refer to. There are hints that legal scholars think that such a dividing line between "direct" and "indirect" treatments may be at interventions that directly impact the central nervous system.[128] On the other hand, as Professor Greely points out, these may be differences in degree rather than in kind, because all interventions that impact behavior end up changing the brain's plasticity in experience-dependent ways.[129]

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126. *See* Rochin v. California, 342 U.S. 165, 172 (1952).

127. *See* Greely, *supra* note 15, at 1134.

128. For example, Richard Bonnie takes pains to point out that naltrexone may be distinguished from other forms of medically coerced treatments, such as chemical castration for sex offenders and anti-psychotic medications for incompetent offenders who pose a danger to themselves or others because "naltrexone does not produce any lasting changes in the patient's brain or personality - it simply reduces craving for heroin and alcohol." Bonnie, *supra* note 48, at 71.

129. *Contra* CENTER FOR COGNITIVE LIBERTY AND ETHICS, THREATS TO COGNITIVE LIBERTY: PHARMACOTHERAPY AND THE FUTURE OF THE DRUG WAR (2004), *available at* http://www.cognitiveliberty.org/pdf/Pharmacotherapy%202004.pdf (criticizing compulsory pharmacotherapy). An affiliate of the Center for Cognitive Liberty's likened

There are several components to an analysis of whether long-lasting or brain-manipulative therapies are intrusions upon liberty and bodily or personal integrity in legally and ethically significant ways. The first is to distinguish whether a participant choosing them is making a fully informed decision from all angles: his legal rights, likelihood of effectiveness, potential side effects, and permanency or duration of all available treatments or options. It also makes a difference whether the person is making this decision with the state's police power forcing or merely guiding him among the various options, and at what point the state offers or forecloses an option. In this sense, leveraged treatment within deferred prosecution models for drug courts is legally distinct from post-conviction mandates for sex offenders or the mentally incompetent and dangerous to accept treatment as a condition of sentencing.[130]

Advances in neuroscience (leading to long-lasting or permanent effects after acute administration or that have collateral consequences of memory or personality modification) shift the burdens on informed consent in two crucial ways. First, they require a person to be able to rationally consider long-term and uncertain outcomes with respect to fundamental issues of identity and agency. Second, they heighten the risk of therapeutic misconception by offering scientifically sophisticated treatments with potentially variable outcomes. Hypothetically, a defendant may be too quick to waive important constitutional rights because he thinks that a new neurotechnology might cure his addiction, when in fact, outcomes may be different or less than hoped for and relapse results in criminal punishment anyway such that he may have been better off in the adversarial system. It seems doubtful that defense counsel would be well-equipped to advise a client, as the "best interests" calculus would become significantly more complex and uncertain.[131] This is but one of many potentially risky scenarios that advances in neuroscience technologies to treat addiction and

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pharmacotherapy for drug addiction to an unprecedented expansion of state power by moving "from external policing to internal policing, and . . . from restraining a person's physical body and behavior to directly restraining a person's brain function and thought processes." Richard G. Boire, *Neurocops: The Politics of Prohibition and the Future of Enforcing Social Policy from Inside the Body*, 19 J.L. & HEALTH 215, 257 (2004).

130. *Cf.* Bonnie, *supra* note 48, at 72, n.50.

131. This is a complication in addition to that already faced by defense lawyers participating in drug courts, where "[z]ealous advocacy is easily misconstrued as denial and a counterproductive unwillingness to provide one's client with the help he allegedly needs." Husak, *supra* note 4 at 220. *See also* Mae C. Quinn, *Whose Team Am I on Anyway? Musings of a Public Defender About Drug Treatment Court Practice*, 26 N.Y.U. REV. L. & SOC. CHANGE 37, 47 (2000–2001) (noting that the defender must modify or mute her traditional role, "take a step back, [and] to not intervene actively between the judge and the participant . . . [to] allow that relationship to develop and do its work ....") (citation omitted); NAT'L ASS'N OF CRIM. DEF. LAW., *supra* note 106.

antisocial behavior may present. Rather than simplifying addiction treatment with advanced technology and greasing the wheels of drug court functioning, such novel therapies complicate the analysis about appropriate balances between relinquishing rights and accepting increasingly invasive interventions in exchange.

C. Beyond Beneficence: Greater Risks Should Reinvigorate Structural and Procedural Protections to Preserve Institutional Legitimacy

About a decade ago, a handful of voices in the legal and policy literature sparred vigorously over the benefits of therapeutic jurisprudence practiced by drug courts and the risks of institutional overreach and misallocation of resources.[132] The latter's critique was founded in criticism of the dual and conflicted nature of drug courts, voiced perhaps most strongly by Judge Morris Hoffman of the Second Judicial District in Denver, Colorado:

> By existing simply to appease two so diametric and irreconcilable sets of principles [law enforcement and medical treatment], drug courts are fundamentally unprincipled. By simultaneously treating drug use as a crime and as a disease, without coming to grips with the inherent contradictions of those two approaches, drug courts are not satisfying either the legitimate and compassionate interests of the treatment community or the legitimate and rational interests of the law enforcement community.[133]

Despite their reported successes, drug courts should still be subjected to doctrinal scrutiny that sets boundary conditions on their current theoretical foundation in "therapeutic jurisprudence."[134] While therapeutic jurisprudence advocates claim that drug court-administered "treatment regimes are not punishment, but the restructuring of the defendant's lifestyle," drug courts are administering such regimes within the shadows of threatened punishments by a confluence of state powers.[135] In such a

132. *See* Morris B. Hoffman, *The Drug Court Scandal*, 78 N.C. L. REV. 1437, 1477 (2000).

133. *Id.* Hoffman drew his argument in part from an earlier article published by Richard Boldt that examines the theoretical underpinnings of the drug courts' departure from the traditional adversarial model. Richard C. Boldt, *Rehabilitative Punishment and the Drug Treatment Court Movement*, 76 WASH. U. L. Q. 1205 *passim* (1998).

134. Peggy Fulton Hora, William G. Schma & John T.A. Rosenthal, *Therapeutic Jurisprudence and the Drug Treatment Court Movement: Revolutionizing the Criminal Justice System's Response to Drug Abuse and Crime in America*, 74 NOTRE DAME L. REV. 439, 523 (1999).

135. *Id.*

framework, Judge Hoffman sees serious threats to institutional legitimacy and risks of negative outcomes when courts overstep bounds of separation of powers (and their own training) and tread simultaneously on legislative public health policy functions and executive punishment functions:

> [D]rug courts are not simply using the traditional powers of bond conditions, deferred judgment, and probation conditions. They are using these traditional judicial powers in a way that is not only non-traditional, but in fact not even judicial. The very purpose of the drug court is not to resolve criminal liability, but to use the threat of criminal liability to coerce defendants into treatment. Again, maybe this approach is entirely sensible, but it is still an approach that is fundamentally legislative . . . .
>
> Providing medical treatment to persons convicted of crimes, or even to persons in custody awaiting trial, is an executive function, not a judicial one. By mechanically imposing treatment conditions on all criminal defendants before they have even entered a plea, drug courts blur the fundamental distinction between the accused and the convicted, and therefore between the judicial function of determining guilt and the executive function of carrying out sentences and treating prisoners.[136]

Critiques like Hoffman's have not been echoed loudly in the intervening decade, perhaps because drug courts "work" and have been adopted rapidly across the country, leading to the impression that therapeutic jurisprudence is operating benignly and beneficently. Still, the courts are not without their critics. For example, Doug Husak has demonstrated recently how, from a philosopher's perspective, drug courts pose a problem to the "principle of parity" and are inconsistent with retributivist theories of punishment.[137] For the reasons discussed above, novel medical treatments for addiction may be the wedge to reopen the debate about the proper social policy and procedures implemented in drug courts. With opportunities for invasive, long-lasting, and highly-impacting treatments coming soon from neuroscience, drug courts must revisit the true roots of a therapeutic jurisprudence framework: a focus on empirically verifiable results with respect for due process protections for personal liberty and autonomy.[138]

136. Hoffman, *supra* note 132, at 1526.

137. Husak, *supra* note 4, at 215.

138. Hora, Schma & Rosenthal, *supra* note 134, at 447.

IV. CONCLUSION: PAVING WITH GOOD INTENTIONS DOES NOT PREVENT A SLIPPERY SLOPE

Unique aspects of how such future drugs and technologies work raise concerns not fully addressed by merely inserting such technologies into a therapeutic jurisprudence framework. Some new drugs and techniques push therapeutic boundaries with respect to invasiveness and irreversibility, and thus, heighten concerns about protecting an individuals' autonomy and due process rights when those treatments are offered and delivered via the coercive powers of the criminal justice system. As long as the criminal justice system is a primary mode of delivering treatment and rehabilitation through quasi-judicial institutions such as problem-solving courts, policy makers and participants must make it a priority to establish clear and consistent guidelines that protect each individual's constitutional rights. These rights include the right to refuse medical treatment, retain effective counsel, not be subject to disproportionate punishment, and make informed and voluntary decisions about their criminal defense or participation in a diversion and treatment program. Current problem-solving courts sometimes soothe such concerns of defense counsel and civil libertarians with a heaping dose of beneficence and expressed intentions to act in the client's best interest, but the addition of therapies that are directly invasive into neural systems should force the issue of how problem-solving courts can act within a framework that has appropriate protections for constitutional rights and individual autonomy.

Fundamentally, novel and invasive therapies that complicate the leveraged treatment delivery picture should reinvigorate a policy debate about whether or not criminalization of some addictive substances remains the best policy for effecting the greatest good with the most efficient use of public resources. A policy of decriminalization may sacrifice some deterrent effects and some ability to leverage treatment for those who may need it most, but it may also strike the appropriate balance of state power against individual autonomy on a public health issue and ultimately save taxpayer funds. The outcomes, however, depend critically on the safety and efficacy of novel treatments, which at present remain unknown. Indeed, such treatments may be a long time coming, which should give decision makers sufficient time to do some of the difficult policy work before serious mistakes are made. It is not too soon to critically consider whether decision-makers should or should not implement all available technologies and therapies and by which mechanisms of state power.