Changing the Criminal Character: Nanotechnology and Criminal Punishment

Katrina L. Sifferd, JD PhD
Assistant Professor of Philosophy
Elmhurst College
Draft 6/17/09

“But it is not true that if acts in accordance with virtue have themselves a certain character they will be done justly or temperately. The one who does them must also be in the right state of character when he acts. First, he must act knowingly, second, he must choose the acts, choosing them for their own sake, and third, he must act from a firm and unchanging character.”

– Aristotle, Nicomachean Ethics, 1105a (emphasis added)

Introduction

This chapter examines how advances in nanotechnology might impact criminal sentencing. While many scholars have considered the ethical implications of emerging technologies, such as nanotechnology, few have considered their potential impact on crucial institutions such as our criminal justice system. Specifically, I will discuss the implications of two types of technological advances for criminal sentencing: advanced tracking devices enabled by nanotechnology, and nano-neuroscience, including neural implants.

The key justifications for criminal punishment— including incapacitation, deterrence, rehabilitation, and retribution— apply very differently to criminal sentences using these emerging technologies than they do to imprisonment. Further, use of these technologies would represent a shift away from retribution as the primary justification for criminal punishment. In addition, the possibility of nano-neural implants entails a new model of rehabilitation: namely, involuntary rehabilitation aimed at changing an offender’s character, rather than his environment.

Traditionally, the criminal law incapacitates offenders by limiting their access to most environments (e.g. house arrest, prison, and in rare cases, death). Offenders are deterred via external disincentives in the form of criminal punishment. Both approaches respect the offender as agent: that is, they attempt to manipulate the offender’s choices by altering his environment, not by altering the offender himself. However, nanotechnology, by way of implanted tracking or neural devices, may allow us to incapacitate or deter by altering an offender directly. For example, a pedophile who commits criminal sexual assault might be implanted with a nano-scale radio frequency identification (RFID) mechanism – one so small that it could never be located by the offender - that allowed for continuous tracking. The offender might also be subject to “neural

1 The author gratefully acknowledges the contributions of Elmhurst College students Amanda Bonanotte and Paul Shakeshaft (class of 2011).
castration” via nano-neurological implants. Both of these sentencing measures operate within the offender’s body.

I will argue that such programs will have a reduced deterrent effect compared to imprisonment, and will incapacitate with regard to specific crimes – such as sexual or domestic assault - instead of guarding against all criminal activity. I will further argue that neither of these technologies may be seen as providing an offender with his ‘just deserts,’ and that they are unlikely to assuage a community’s moral outrage at the crime committed. Thus these new technologies may fail to satisfy the principle of retribution.

My primary point here will be that both of these technologies raise serious ethical concerns in that they may violate an offender’s agency, without advancing the principles of punishment. Even though neural implants can be seen as rehabilitative, in at least some cases they may be a mandatory part of a criminal sentence. Thus it seems use of emerging technologies in sentencing opens the door for involuntary rehabilitation, or involuntary manipulation of an offender’s character. This comprises a violation of agency in that it attempts to influence or manipulate an offender internally, instead of attempting to influence him externally (by altering his environment).

Below I will first provide a brief account of the traditional principles, or justifications, of criminal punishment. Next, I will explore the way in which nano-tracking devices and nano-neurological implants may be used in criminal sentencing. Finally, I will give a detailed argument regarding the way in which use of such technologies may, or may not be, justified via the principles of punishment, and the ways in which they entail a violation of agency.

I. The Principles of Punishment

Most feel the primary aim of the criminal law is social order or control. (Hart 1968; Bentham 1996) Thus, the American Model Penal Code (MPC), used as a guideline for individual state criminal codes, states it seeks to “…forbid and prevent conduct that unjustifiably and inexcusably inflicts or threatens substantial harm to individual or public interests.” (Proposed Official Draft 1962) This goal is achieved by via certain ‘principles of punishment,’ which guide the structure of criminal offenses and punishment. These principles include:

(1) Deterrence of harmful acts. This principle includes both specific deterrence of a particular offender from recidivating, and deterrence of the general population from committing a particular class of acts.

(2) Incapacitation. This principle indicates that offenders who are not likely to be deterred may be held to prevent them from recidivating.

(3) Rehabilitation. This principle envisions that an offender might be somehow taught not to recidivate.
(4) Retribution. This is the principle of ‘just deserts,’ where the offender is thought to deserve to have something bad happen to him, because he has performed a harmful act. It is also thought to perform the function of assuaging social outrage that may arise due to performance of a harmful act.  

The content and structure of the criminal law can be justified by looking to the principles of punishment. For example, the two requirements that must be met for one to be found guilty of a crime in a common law system, and the gradations of culpability, can be understood via these principles. To return a guilty verdict, a judge or jury must find the defendant (1) committed the act that caused criminal harm voluntarily (the voluntary act requirement), and (2) had a certain mental state with regard to that act (the mental state requirement). Generally, the mental state requirement means the offender must have performed the act that caused criminal harm purposely, knowingly, recklessly or negligently. (Proposed Official Draft 1962)

Criminal harm closely related to an offender’s desires – acts that cause harm desired by the offender – are punished under the law most severely; whereas acts performed “on accident” are not punished at all. The difference in treatment between the two sorts of acts is justified by the principles of punishment in the following way: In comparison with acts performed on accident, acts closely related to an offender’s desires are (1) most likely to be deterred by threat of punishment; (2) more indicative of future dangerous acts, and thus the offender is a better candidate for incapacitation and rehabilitation; and (3) more morally reprehensible and thus more deserving to retribution. However, a person who accidently trips and thus discharges their gun (1) would not have been deterred by threat of punishment; (2) is not likely to be dangerous in the future and thus is not a good candidate for incapacitation and rehabilitation (extreme klutziness notwithstanding); and (3) is not deserving of moral condemnation or retribution.

Further, the length or type of criminal sentences can be justified by the principles of punishment. In the US, a person who desired the death of another, and then killed them, is found guilty of first degree murder and thus is subject to more punishment than one who killed recklessly. Only a very severe penalty stands a chance of deterring the offender who directly desires to commit criminal harm. And, the “intentional” offender is most likely to be dangerous in the future, and thus is a candidate for long-term incapacitation. He is also more morally blameworthy and therefore deserves retribution.

2 Some also argue that ‘restoration’ is a principle of punishment that should guide the criminal law system. This principle would require offenders to somehow ‘restore’ the victim and society, or make them ‘whole’ again. It is unclear that this principle is currently taken seriously in the US, although there have been some pilot programs aimed at introducing it. For a general discussion of restoration, see Johnstone, G. and D. Van Ness (2006). Handbook of Restorative Justice. UK, Willan Publishing.

3 Jeremy Bentham provides a detailed account of the consequentialist view of law that emphasizes the role mental states plays in the justification of verdicts and sentencing. Bentham, J. (1996). An introduction to the principles of morals and legislation / Jeremy Bentham with a new introduction by F. Rosen and an interpretive essay by H.L.A. Hart. Oxford, Claredon Press. As punishment subtracts from a society’s overall happiness by causing pain amongst its citizens, “…it ought only be admitted as far as it promises to exclude some greater evil.” (158) Thus in certain cases punishment should not be applied; these include (1) where an act is not actually an evil “on the whole”, (2)
Different theories regarding the legitimacy and purpose of the criminal law, however, emphasize different principles of punishment as more important. Consequentialist justifications of criminal law, such as those offered by Jeremy Bentham, tend to emphasize the principles of deterrence and incapacitation, as they have easily identified consequences for social order. According to the consequentialist view, in addition to identifying and punishing harmful acts already committed, the criminal law also attempts to process offenders in a way that will prevent future harm to society. The principles of deterrence, incapacitation and rehabilitation achieve this in an obvious way by either convincing or forcing an offender not to do further harm; or by changing an offender such that they are less likely to do criminal harm. Thus, the criminal law attempts to secure social order by “…announc[ing] to society that [criminal] actions are not to be done and [attempting] to secure that fewer of them are done.” (Hart 1968: 6)

The principle of retribution is thought to further social order by minimizing vigilante justice and strengthening citizen support for the rule of law, as well as serving some psychological aim of making victims and the community ‘feel better’ about a crime. Retribution, however, is also thought to entail the moral condemnation of criminal acts. That is, according to the principle of retribution, it is right to punish someone even if it does nothing to further the aim of social order, because they have committed a moral wrong. As HLA Hart noted, “…meeting the moral evil of misconduct with suffering is, as Kant urged, good per se, so that, even on the last day of society, the murderer not only may but must be executed” even though that execution will have no good consequences for society. (Hart 1968: 65)

Some scholars argue that retribution is the most important of the justifications for punishment.4 (Moore 1988; Bradley 1999) According to “legal moralists” the criminal law’s primary purpose is to achieve justice by punishing those who are morally culpable in the performance of some wrongful action. (Moore 1988) Even legal moralists, however, believe that the principles of deterrence and incapacitation serve as secondary justifications of punishment. (Bradley 1999) Similarly, HLA Hart argued that criminal law should have both a consequentialist and moralist justification. (Hart 1968) While he felt the primary aim of the criminal law was social order, he noted that the criminal law recognizes offenders as ‘thinkers’ who should only be culpable when they can foresee the application of punishment for an act, because this is the grounds for moral culpability. The defenses available to criminal culpability, Hart argued, indicate that punishment is not applied in a common law system based purely on deterrent or incapacitative effect. (Hart 1968) Thus Hart attempts to ‘side constrain’ a consequentialist theory of law with the notion that humans are agents who are responsible when they choose to commit harmful acts.

This chapter will assume that all four of the justifications for punishment listed above are legitimate. This seems to be a safe assumption, given that most of the disagreement about the
justifications for punishment concern which principle should be considered the primary justification for criminal punishment, not whether the four principles above are legitimate reasons for punishment. Because I examine how each of the principles may be impacted by the use of emerging nano-technologies, my argument will remain relevant regardless of which justifying principle one considers most important.

II. Nano-Tracking Devices

New technologies are already being used in an attempt to more efficiently execute existing sentencing policies. Most often, the “efficiency” sought is monetary. The US incarceration rate has almost doubled in each decade since 1970, increasing from 135 per 100,000 US residents in 1978 to 244 in 1988 to 460 in 2003. (Steen and Bandy 2007) As a result of this rise in prisoners, state corrections expenditures were the second fastest growing component of state budgets during the 1990s. (Steen and Bandy 2007) State prison operating expenditures totaled $28.4 billion in fiscal year 2001, with a nationwide average annual operating cost per inmate of $22,650. (Stephan 2004)

When compared with incarceration, home detention and electronic monitoring (EM) programs are substantially cheaper. Older EM programs, such as one in New York City, cost only $2.91 per offender a day, or $1,652 a year. (Raab 1991) However, even newer, more sophisticated EM programs involving GPS tracking are considerably less expensive than incarceration. The Napa County Board of Corrections recently adopted a GPS EM program, noting that the program cost only $15 a day in comparison to the $109 a day cost to keep offenders in jail. (West 2008)

Electronic monitoring was first used in 1984 in Florida as a part of a house arrest program. (Mainprize 1992) Some sort of home confinement with electronic monitoring was in place in all 50 US states by 1990. (Padgett 2006) In most cases, electronic monitoring is done via an ankle bracelet. At timed intervals, the ankle bracelet sends a radio frequency or GPA signal to a receiver. If an offender moves outside of an allowed range, the police will be notified. The first generation bracelets consisted in a radio-frequency transmitter unit that sent a signal to a fixed location receiving unit in the offender's residence. The residence unit then used either a land line or a cellular network to relay information to a service center computer. If the offender is not at the residence at times stipulated, an alert message is sent to the service center, and then relayed to the supervising probation or parole officer. (Padgett 2006)

As mentioned above, second-generation electronic monitors include GPS technology. The offender either carries a GPS cell phone unit that receives a signal from the ankle unit, or both functions are combined into one ankle unit. (Padgett 2006) At least fourteen states have statutory provisions regarding GPS tracking of sex offenders. (Hinson 2008) A Florida statute, entitled Jessica’s Act, requires persons convicted of sexual offenses against children under the age of twelve to be subject to lifetime electronic monitoring. Pennsylvania and California have similar provisions. (Hinson 2008) A Massachusetts statute allows courts to impose GPS tracking systems
on domestic abusers who have violated restraining orders and have been identified as dangerous after an assessment. (Hinson 2008) In some of the programs, the offenders bear the cost of monitoring: in Massachusetts, they are charged $8 a day for a cell phone-like device that clips to a belt, an ankle bracelet and a home charger. The offenders’ movements are then monitored by three control centers, and if they break an “exclusion zone” around the victim or her children, the police are notified. (Green 2009) Twelve other states have passed similar legislation, and as a result, about 5,000 domestic abuse offenders are being tracked nationwide.⁵ (Green 2009)

However, GPS technology has its limitations. In the UK, more than 17,000 individuals, including criminals and suspects released on bail, are currently subject to monitoring under curfews requiring them to stay at home up to 12 hours a day. However, almost 2,000 offenders a year escape monitoring by tampering with ankle tags or tearing them off. In addition, officials reported losing track of offenders when they were in the shadow of large buildings. The UK Ministry of Justice is thus investigating the use of subdermal chips. (Brady 2008)

Many feel that radio frequency identification (‘RFID’) technology is the next generation of tracking device. (Rosenberg 2007 / 2008) In 2004, the Food and Drug Administration approved use of subdermal RFID in humans. Currently, over 2000 people have RFID chips implanted in their bodies, including children in Britain and the Mexican Attorney General and his staff. (Rosenberg 2007 / 2008) The Department of Defense is supposedly considering use of RFID technology to track soldiers and carry information about their health onto the battlefield. (Rosenberg 2007 / 2008) To date, in the US there has been no federal legislation either encouraging or prohibiting the use of tracking implants in the criminal justice system. (Rosenberg 2007 / 2008)

Unlike GPS technology, which relies on a network of satellites to transmit signals of a wearer’s location, RFID tags communicate with proximate readers via radio frequency. (Rosenberg 2007 / 2008) This, however, requires that a RFID infrastructure be in place. (Rosenberg 2007 / 2008) Some infrastructure already exists in the US: in many states, for example, RFID systems allow for cars to avoid manually paying tolls, instead using a RFID ‘E-Z pass.’⁶ (Wolfe 2005) It seems state criminal justice systems could utilize these already existing networks, and implement new ones, as a means to start using RFID chips as a way to track criminal offenders. It seems possible that at some point federal legislation may allow for a unified tracking system across state boarders.

RFID chips, like ankle bracelets, may still be removed by offenders if their implantation site is fairly clear. Nanotechnology, however, will inevitably enable smaller, and more efficient, RFID tagging. A 2007 article in the magazine ‘Industry Week’ makes this clear: (Rickert 2007)

Let’s start with how RFID works. Imagine something that looks a little like a 2”x2” decal with an X-shape on it and a tiny dot at the center. The dot is a microchip. The X is the

---

antenna, which, in our example, uses silver as a conductor. With current technology, the effective reach of the device is governed by the size of the antenna. That means more silver is required, increasing size and cost. That's where nanotechnology can help. Nanotechnology could enable a denser layer of silver nanoparticles on a thin film, which would make possible a smaller and thinner antenna that could provide the same (or better) signal. Smaller size, greater functionality, less cost. Now let's throw in durability. Decreasing the size of the antenna can also improve the longevity of the devices. Larger, thicker antennae are more susceptible to being bent and broken. In addition, there's an air-tight package around the antenna, which can crack, exposing the antenna silver to oxidizing air. Smaller units offer less room for damage.  

A bit later in the article, the author notes: “When RFID prices get to a penny, where can the market go? Just about anywhere. Tags can go into Fido's collar to help the dog catcher bring him home safe. Soldiers and equipment in the field would never be ‘off the grid.’” (Rickert 2007) And criminal offenders could be continuously tracked for the rest of their lives.

If a nano-RFID doesn’t already exist, it soon will. And, as noted above, it seems that the criminal justice system would certainly be interested in cheaper, more reliable tracking of offenders, especially given that tracking has already been accepted as a legitimate sentencing tool.  

### III. Nano-neural Interventions and Implants

Nanotechnology has already been used to detect activity of individual neurons via platinum nanowires. (Jain 2006) This allows for an understanding of the brain at the neuron-to-neuron interaction level. And because nanowires can deliver electrical impulses as well as receive them, they allow for the direct stimulation of neurons (Jain 2006) which can then allow for manipulation of brain processes: and, potentially, manipulation of thought.

In addition, quantum dot technology is being used to gather information in the brain at the level of the neuron. Nano-sized functional quantum dots can help build data-capture devices that are easy to use by neuroscientists. (Silva 2006) Many feel that nanotechnology will eventually allow for targeted interactions with neurons and glial cells, the cells responsible for signal transmission in the brain. As explained by Armin Grunwald:

---

7 http://www.industryweek.com/articles/taking_the_nanopulse_-_my_rfid_tag_is_smaller_than_your_rfid_tag_13702.aspx

8 However, there is some worry that the statutes allowing advanced tracking of offenders will fail to pass constitutional review. Although the Supreme Court has not yet issued a ruling dealing with GPS tracking devises, statutes that continuously track offenders – including in protected areas such as the home – might violate the wearer’s Fourth Amendment rights against unreasonable search and seizure. (Id.) However, a statute that only transmitted data of the offender’s whereabouts when he had entered a ‘forbidden zone’ would avoid this problem. Similarly, any statute that tracks all offenders of a certain type – such as sex offenders – without an individualized finding of dangerousness might violate the Fourteenth Amendment.
Nanotechnology offers a range of possibilities for gathering, storing, and distributing personal data in an increasing extent. ... [Furthermore] passive observation of people could, in the distant future, be complemented by actively manipulating them—for instance, if it would be possible to gain direct technical access to their nervous system or brain. ... These possibilities are regarded by some to be not only realistic, but even certain. (Grunwald 2005)

Ultimately, it seems clear that nanotechnology will allow us to visualize and track functional responses in neurons: that is, we will be provided information about a person’s thoughts remotely. In addition, several brain probes and implants are already being used in neurosurgery, although many of them are still investigational. (Jain 2006) Nanotubes, particularly made of carbon, hold great promise for replacing conventional silicone implants, “...because of their interesting electronic properties and reduction in scar formation.” (Jain 2006) Ultimately, such nano-neurological implants could be used not only to track neuronal activity, but to manipulate neuronal activity. This translates into the ability to manipulate thought; possibly via transmission or implantation of desires or beliefs. (Sifferd 2008)

As indicated above, it is most likely that nanotechnology, including neuro-nanotechnology, will initially be used to more effectively achieve sentencing policies already in operation. For example, one might imagine a defendant, John, who was found guilty of the molestation and murder of a young boy who lived next door. As a part of his sentence, John is forced to register as a sex offender. He is also required to participate in a castration program. Below we will consider how nano-neuroscience might be used on an offender such as John.

Six US states (California, Florida, Georgia, Texas, Louisiana, and Montana) have chemical castration laws.⁹ California was the first state to use chemical castration as a punishment for sex offenders. (Smith 1998) In cases where the victim is under 13 years of age, California judges may require first-time offenders to undergo chemical castration. After a second offense, treatment is mandatory. In Iowa and Florida, offenders may be sentenced to chemical castration in all cases involving serious sex offenses. As in California, treatment is mandatory after a second offense. Recently Louisiana Governor Bobby Jindal signed a bill allowing Louisiana judges to potentially sentence all convicted rapists to chemical castration.¹⁰ (Millholon 2008)

Depro-Provera is the drug most often used for chemical castration. (Smith 1998: 6) It is an analogue of the female hormone progesterone, used to reduce the normal level of testosterone in a male by fifty percent – a level equal to the level found in pre-pubescent boys. (Smith 1998: 141) The drug reduces sex-drive, often diminishing ejaculator fluid to zero. Capacity for an erection can disappear almost immediately or slowly over some months. In some, however, the capacity for an erection may never disappear completely (Smith 1998: 6).

---

⁹ FOOTNOTE about how such laws only apply to male offenders (if true).
¹⁰ Skinner v. State of Oklahoma, Ex. Rel. Williamson, 316 U.S. 535 (1942), held that forced punitive sterilization is unconstitutional. It seems unlikely that the current Supreme Court will uphold the Louisiana chemical castration statute, which provides a form of punitive forced sterilization.
Depo-Provera has potentially serious side effects, including thromboembolism, weight gain, fatigue, malaise, mild depression, hypertension, hyperglycaemia, and liver problems. (Harrison 2007) Moreover, to maintain the effects of Depo-Provera, a high volume of injection is required regularly. Most chemically castrated men will probably receive 400 to 500 milligrams of Depo-Provera per week, which amounts to an injection of 2.5 milliliters into each buttock each time (Macready 1996). This high volume of injections, and the subsequent side effects, may contribute to the high dropout rate seen with voluntary chemical castration (Macready 1996).

Moreover, to maintain the effects of Depo-Provera, a high volume of injection is required regularly. Most chemically castrated men will probably receive 400 to 500 milligrams of Depo-Provera per week, which amounts to an injection of 2.5 milliliters into each buttock each time (Macready 1996). This high volume of injections, and the subsequent side effects, may contribute to the high dropout rate seen with voluntary chemical castration (Macready 1996).

In addition, there is no guarantee that chemical castration actually works. Individuals vary in their response, and men given oral doses as high as 700 milligrams per day have still reported regular sexual arousal (Macready 1996). Studies indicate that the drug, when used in conjunction with ongoing counseling, allows most pedophiles to self-regulate their sexual behavior. However, because the drug does not eradicate sexual attraction to children, and often does not completely eliminate sexual activity, its success often depends upon an offender’s attitude to the therapy. If an offender wants to stop preying upon children, the drug can help them to do so. If they do not, the drug can only hinder their attempts to perform sexual assault.

Let’s go back to our sexual offender, John. We first might imagine that nanotechnology could be used in addition to chemical castration. John could agree to have nanotechnology (such as functionalized quantum dots) implanted in his brain to gather information. Multiple quantum dots could be implanted, some in the area where the man held representations of children, others in areas indicating sexual arousal, and another few on the pathway between these two areas. If the dots ever detected simultaneous activity, this information was transmitted to John’s parole officer who was then under an obligation to track John down and investigate. This would provide a safe-guard to ensure the chemical castration was working.

Or, neurological castration could be achieved via direct inhibition of activity in certain parts of the brain (e.g., within the hypothalamus), or by blocking connectivity between areas of brain (e.g. between representations of children and sexual arousal). Remember, neuroscientists claim that active manipulation of brain states via nanotechnology is not just realistic, “…but certain.” (Grunwald 2005) We are already inhibiting brain states in cases of epilepsy and Parkinson’s. One can imagine that a nano-technological approach to castration may be more successful, and have far fewer side effects, than current methods. 11

One might imagine that neurological castration could just be the beginning of nano-enabled neurological sentencing. If it became possible to neurologically inhibit strong violent responses

11Again, however, there are questions about whether neuro-castration would pass constitutional muster. The Eighth Amendment forbids punishments that are ‘cruel and unusual’. Such a punishment does not appear to be crueler than current measures designed to create the same deterrent effect, such as permanently incapacitating, imprisoning or institutionalizing, or chemically castrating an individual. Nano-neuroscientific approaches could be deemed “unusual” in the common language sense of the word, but probably not in the way the Supreme Court has interpreted the Eighth. To be “unusual” in this sense a punishment must be rare (in that it is not practiced by a critical mass of states) and violate “evolving standards of decency”. (see Furman v. Georgia 408 US 238 (1972))
to stimuli, the state might offer offenders the chance to submit to this operation in exchange for a shortened or commuted sentence. Granted, at the moment this possibility is more fiction than science. However, given the success in drug interventions on aggressive behavior – for example, with tranquillizers and some anti-depressants – it doesn’t seem impossible that neuroscience could discover a more targeted means of delivering the same result.

IV. Application of principles of punishment

As stated above, the traditional means of punishment – with the possible exception of capital punishment – punish an offender while respecting his autonomy or agency. In the philosophical sense, autonomous agents are self-governing: they choose, or are the locus of, their acts. The criminal law assigns responsibility based upon the fundamental assumption that an offender ‘owns’ his beliefs and desires, and if those beliefs and desires cause criminal harm, he can be punished for them. Virtue ethicists, such as Aristotle – cited at the beginning of this paper – add the requirement that virtuous or evil acts come from a “firm and unchanging” character trait. Aristotle feels that such acts are truly indicative of the sort of person who performs them; therefore, a choice to commit homicide that springs from one’s character truly deserves to be labeled an immoral act and punished. (Aristotle 1985) Note that this requirement agrees with the commonsense way we speak of ourselves: when we do things outside our character, we often say ‘something came over me’ or ‘I wasn’t myself’. When one is in such a state it is less likely a judge or jury will find any criminal harm was committed ‘purposely’ (the level of intent which earns the highest level of criminal culpability). However, when one is acting from character – for example, when a person who consistently exhibits a violent temper commits a violent act – it is much more likely that he or she desired the outcome of such action in a way deserving of full criminal culpability.

The principles of deterrence, incapacitation, retribution and rehabilitation, as exhibited by the US criminal justice system in the recent past, assume and attempt to influence offender agency. The goal of these principles has been to change potential offender’s minds about committing crime, or to put them somewhere where they cannot do any further harm when their criminal character seems set. Or, in the case of retribution, to assign moral responsibility based upon an assessment of the offender as the locus of an act deemed immoral.

The usual demarcation of the physical boundary of agency is a person’s skin. However, the emerging technologies discussed above breach the external/internal distinction marked by human skin. These technologies influence an offender from within, and, in the case of nano-castration, or any other direct neural manipulation, attempt to influence human decision-making from the inside out. I argue below that use of these technologies cannot be justified by the principles of deterrence and incapacitation. Further, they would represent a shift away from retribution as the

---

12 This is case even according to theories that argue that human action is determined by the laws of physics (compatibilist theories). See, for example, Ayer and Stace.
primary justification for criminal punishment. Finally, the model of rehabilitation use of these technologies could promote is ethically suspect.

Deterrence

The principle of deterrence is supposed to reduce crime by setting the expected cost of committing a crime high enough to dissuade potential criminals from choosing to commit illegal acts. (Becker 1968; Mendes 2004) The idea behind deterrence is that potential criminals have a choice regarding their actions, and they will opt to commit a crime if the expected gain exceeds the expected cost. (Mendes and McDonald 2001) The expected cost is the probability of being punished, reflected in arrest and conviction rates, operating in conjunction with severity of punishment. (Mendes and McDonald 2001)

Generally, any sort of monitoring system, where the offender is free to move about his home or within his community, will have a lesser deterrent effect than incarceration. Incarceration will be viewed by most potential offenders as a more severe punishment because it is a greater infringement upon liberty. This is why incarceration is reserved for more severe felony offenders. One who is being electronically monitored while under house arrest may enjoy the comforts of their own home, eat the food they wish, and visit with friends and family. An offender being monitored who is not on house arrest enjoys relative freedom to move about their community and go to a job, school, church, etc. For the potential offender considering the cost of committing a crime, incarceration is going to be granted a heavier weight than monitoring, and thus will have a larger deterrent effect.

For example, Jasper is a young man considering stealing a car so he can drive to Florida to see his girlfriend. Before he commits the crime, however, he is likely to consider the possibility that he might get caught, tried, and criminally punished. If Jasper knows he will be released under electronic monitoring if he is found guilty of stealing the car, he is more likely to commit the crime than if he thinks he will serve 20 years in prison for stealing the car.

Electronic monitoring, however, does appear to have some deterrent effect. (O'Toole 2000) One study suggested the longer the amount of time on electronic monitoring, the lower the likelihood of recidivism. This effect, however, varied by offender type. (O'Toole 2000) One might imagine that new generation nano-tracking may have a slightly higher deterrent effect than ankle bracelet monitoring, due to its potential permanence within the offender’s body and the inability of offenders to tamper with the tracking devise. Nano-tracking also has the possibility of being life-long; in the very least, the tracking devise will be a permanent fixture in an offender’s body, even though it may be turned off.

Nano-tracking, like all new generation monitoring, could also allow for global tracking of offenders, instead of just monitoring whether an offender leaves or infringes upon a specific geographic area. This again would seem to have an added deterrent effect.
This slight added deterrent effect in comparison to traditional monitoring systems, however, is outweighed by the ethical concerns raised by the technology. As stated above, although an implanted nano-tracking devise does not attempt to manipulate offender decision-making directly, as nano-castration does, it breaches the traditional barrier of autonomy (human skin). The implantation of tracking devices already performed has set a dangerous precedent. In nano-tracking cases, where the tracking device is impossible for an offender to locate and remove, we will have begun to slide down the slippery-slope toward irreversible manipulation of offender’s physical self or biological processes.

Let’s now consider whether the use of nano-castration can be justified by the principle of deterrence. Generally, castration has a less deterrent effect than incarceration. Although there is no doubt that limiting a person’s sexual activity has severe quality of life ramifications, it still seems that incarceration would have a stronger deterrent effect, because incarceration is a more encompassing limitation of liberty. When one is castrated, ones’ sexual life is restricted; but if one is incarcerated, all aspects of a person’s life are restricted.

Castration is of course likely to have some deterrent effect. The threat of losing one’s sexual liberty would seem to have some impact upon a person’s decision to commit a crime. It would seem, however, that the threat of chemical castration and nano-castration might weigh fairly equally upon the potential offender’s mind: although nano-castration, just like nano-tracking, has the potential to be more far-ranging and permanent, nano-castration is likely to have only a slightly larger deterrent effect.

I think both chemical and nano-castration, if administered as involuntary programs, or if administered in cases where an offender feels they have no reasonable means to refuse, are violations of offender agency. Both are a direct attempt to manipulate an offender’s character – the self that acts as the seat of decision-making – in violation of his agency, and both breech the skin boundary. Nano-castration may do this in a more permanent, or effective manner than chemical castration, but in essence they are the same.

I’ll further discuss the ramifications of this sort of sentencing below under Rehabilitation, as I think such programs would be best understood a new sort of rehabilitative program.

In sum, the principle of deterrence certainly doesn’t support the use of castration over incarceration. That is, there is certainly no added deterrent effect of using these technologies, when compared with incarceration. Nano-castration and chemical castration would appear to have similar deterrent effects. However, there are real ethical concerns about the use of such sentences as they violate offender agency.

Incapacitation

The Federal Sentencing Guidelines state that a repeat offender is “more culpable”. This increased culpability is not intended as a judgment of the instant criminal act or of the level of wrong-
doing exhibited. Instead, the Sentencing Guidelines acknowledge that one goal of sentencing is to recognize and incapacitate those who are likely to be dangerous in the future; it is a “… judgment about the defendant’s will in general, his character. …The habitual offender has shown himself to be impervious to deterrence.” (Bradley 1999)

Traditionally, the criminal law responds to the increased culpability of the recidivist by incarcerating him: the dangerous offender’s ability to commit crimes is controlled by restricting his access to people and things. It is thought that the long sentences imposed on the repeat offender exhibit an intention to warehouse career criminals until their energy for criminal acts has waned. (Bradley 1999)

Our traditional means of incapacitation – placing an offender in a prison cell – incapacitated with regard to any further crime. An offender who is sent to prison for 45 years after his third rape conviction isn’t just kept from committing future rapes; he is incapacitated with regard to all possible crimes. Monitoring offenders, however, isn’t incapacitative in this sense. Even an offender on monitored house arrest still has some chance of recidivating: many crimes can be committed from the home. Further, if the offender were to leave the home in violation of his house arrest, it is likely that he would be able to commit crimes before he was captured. Similarly, an offender who was monitored and asked to stay away from certain persons or places could easily commit crimes violating these rules before they were caught.

Clearly, the primary aim of a tracking devise, nano or otherwise, is not to incapacitate, but to find an offender if they violate their parole or commit a new offense. So the use of nano-tracking cannot be justified by the principle of incapacitation.

Neural implants, such as one which neurologically castrates an offender, may incapacitate with regard to specific types of crime (e.g. sexual assaults). However, it is unlikely an implant could incapacitate with regard to all crime as a prison cell does.

This sort of targeted incapacitation may have some value, as it could address the threat of recidivism in a more offender-specific manner without denying an offender all their fundamental liberties. For example, it seems pretty clear that castration may incapacitate with regard to sexual, but not other, crimes. In this case the tax payers may be seen as getting more ‘bang for their buck’: the offender is incapacitated without society having to bear the cost of housing and feeding the offender. And the offender gets to enjoy some liberties while they are incapacitated with regard to their specific criminal tendency.

However, as discussed above, there is an important ethical difference between external and internal incapacitation. Incapacitation via incarceration or house arrest limits offenders’ choices for behavior without breaching their agency. Incapacitation via manipulation of internal chemical states, as accomplished by chemical castration, or manipulation of decision-making processes, as nano-castration might enable, changes the behavior of an offender by changing his psychological states. That is, such programs change who an offender is – their character – instead of changing
their environment. This seems like too high a price to pay for cost savings. And, if the castration is administered involuntarily, this cost cannot be justified by increased offender liberties.

----

Retribution

The justifications for criminal punishment tend to wax and wane in their influence upon criminal justice policy based upon political zeitgeist. Indeed, in an attempt to explain the dramatic increase in incarceration rates in the past few decades, some have argued that there has been an ideological shift in the principles of punishment: while rehabilitation was considered an important aim of punishment up to the early 1970s, rehabilitative programming is now a tiny percentage of penal costs. (Steen and Bandy 2007) In the 1980s, sentencing that was seen as “tough on crime” gained political capital and increased substantially. As Michael Tonry notes, “Some other governing rational for sentencing policy was bound to take the place left empty when rehabilitation lost favor. In both academic and policy circles, that place was taken (sometimes implicitly) by retribution or ‘just deserts’.” (Tonry 1996)

Retribution morally condemns a criminal act and offender, and metes out punishment based upon an offender’s “just deserts” based upon the level of moral wrongdoing he has committed. In so doing, retribution “permits consideration of popular revulsion toward certain kinds of offenses.” (Bradley 1999) That is, the level or type of sentence may be chosen in part to acknowledge, or in response to, the moral outrage of the community.

In short, it is unclear that either of the nano-technologies discussed above, provides an offender with his ‘just deserts,’ especially when contrasted with incarceration. This is because, for reasons discussed above, both nano-tracking and nano-castration are less severe punishments than incarceration. When compared with more traditional tracking or chemical castration, the sentences seem roughly comparable in severity – again, for reasons discussed above. Both nano and traditional tracking have the overall effect of giving offenders more freedom. And both types of castration have the effect of severely limiting one sort of liberty, but not all liberties, as incarceration does.

If the public sees incarceration as a fair and just response to sexual assault, for example, it seems clear that castration will fail to satisfy to the moral outrage of the community. In many places, legislators have been driving the “tough on crime” agenda fueled by community outrage in response to some particularly severe sexual assault cases.

Overall, they are unlikely to feel satisfied with less severe sentences that provide an offender with more personal liberty (or have a rehabilitative ‘feel’).

In sum, these technologies are certainly less retributive than incarceration. Because they may represent permanent alterations to an offender’s body, instead of temporary alterations, one may
argue that as penalties they are slightly more severe than current electronic monitoring or chemical castration. However, this added severity is offset by the added freedom nano-tracking may provide, and the possible felt benefit of being free of anti-social urges.

Finally, as an aside, it is interesting to note that the current emphasis on retributive sentencing has resulted in a shift at both the state and federal levels away from indeterminate sentencing systems - where the judge or jury are asked to determine the appropriate sentence - to determinate ones, whereby conviction of a specific crime results in a specific sentence. (Steen and Bandy 2007) Thus many of the sentencing strategies enabled by emerging technologies, including electronic monitoring and chemical castration, automatically follow from a specific type of guilty verdict. This contributes to worries about involuntary rehabilitation programs, discussed below.

**Rehabilitation**

Rehabilitation is the idea that offenders can be reformed such that they won’t recidivate. For the first seven decades of the 20th century, rehabilitation was often thought to be the dominant principle of punishment, especially among correctional elites and criminologists. (Cullen and Gendreau 2000) Rehabilitation has since fallen out of favor as a justification for punishment, except in the realm of juvenile justice (and more and more juveniles are now being sent to adult court so they are eligible for ‘adult’ sentences). (Bradley 1999) The death knell of rehabilitation was sounded by Robert Martinson’s (1974) influential “nothing works” essay, which reported that few treatment programs reduced recidivism. (Cullen and Gendreau 2000) The Federal sentencing guidelines reject rehabilitation as a goal of punishment.

Nanotechnology may allow us to embrace the latter principle of rehabilitation, because we could use nanotechnology to directly change behavior. As mentioned above, one might imagine that nano-castration could just be the beginning of criminal rehabilitative programming where we could surgically removed anti-social behavior. One wonders whether nanotechnology could eventually be a source of what some might call an “artificial conscience,” via methods similar to the government imposed chip that stopped Spike the vampire from feeding in the fabled television show, Buffy the Vampire Slayer.

---

13 Many have argued that the sentencing policies that have emerged in the past few decades are both ineffective – in that they are extremely expensive and have not led to a decrease in crime – and unfair to offenders. Steen, S. and R. Bandy (2007). "When the policy becomes the problem: Criminal justice in the new millennium." Punishment and Society 9(1): 5-26. Thus, while the sentencing options brought forward by emerging technologies, including nanotechnology, place a very different emphasis than the current trend, many feel it is time for a change.


15 Every time Spike attempted a violent act against humans, the “chip” caused him severe head pain preventing him from performing the act. Eventually he stopped trying to act immorally. The question posed to the characters on the show (and the viewers) were: (1) To what extent is the altered Spike different than those of us who act morally due to the inculcation of moral rules? (2) Is Spike now a “good” or “bad” guy? (3) The difference between humans and vampires was that they lacked a soul: Can we now say that Spike has a soul?
Changing an offender’s loci of decision-making represents nothing less than changing the offender’s identity. Most philosophers believe that one’s psychological states – our beliefs, our desires, our memories – are a crucial component of one’s identity. (Locke 1694; Dennett 1978; Hume 2000) It is hard to imagine a larger intrusion upon one’s agency than directly altering one’s psychology. Our psychological states are the ‘source’ of our behavior: we act a certain way because we desire and believe certain things. Indeed, we are criminally responsible for acts when they are linked with our desires, and as stated above, the more closely our desires are tied to criminal harm caused, the more culpable we are under the law. (Sifferd 2006) Involuntary manipulation of psychological states would be a severe violation of human agency in that it would infringe upon the ability of a human being to choose, and be responsible for, his own acts.

However, use of technology in this way raises serious ethical concerns even if offenders participated in such programs voluntarily. First, would we really be giving offenders a choice with regard to nanotechnological alteration if they must choose between thirty years in prison and freedom after a “simple” operation? There are real worries that such an option would be no option at all.

Second, do we really want to permanently neurologically alter citizens into a certain idea of what it is to be a “good” citizen? Up to recently, persons who violate the law are allowed to remain the sort of person they are (even if that person was a pedophile), although the space within which they are allowed to be that person is limited to a jail or prison. And after an offender served their time, persons are released to continue to pursue their individual desires. Alternatively, persons might be released from prison if our idea of moral standards changes and their desires are no longer deemed criminal (e.g., consider what happens with political prisoners when there is a regime change.) Before permanently altering offenders based upon a societal moral code, not only may be deny a person the right to freely chose their own character, but we will also need to claim that the moral code to which we mold their new character is in a sense “timeless.”

But, don’t we already attempt to change criminal offender’s desires when we attempt to deter them via imposition of severe penalties, or when we put them in mandatory drug rehabilitation? We do. But in these cases we attempt to change an offender’s psychology by changing their environment; again, we don’t directly manipulate their decision-making processes. Consider the following example. James is the sort of character who, once his mind is made up, nothing can change it. He has decided that short people – grown-ups under 5 feet tall – literally have no reason to live. Hence, he has decided to dedicate his life to killing short people.

16 A related matter is the ethical question of authority and regulation: who gets to decide which prisoners are eligible for alteration? How serious will the antisocial desires have to be to deserve alteration? Further, if state or federal legislature(s) mandates alteration of certain classes of offenders, judges and juries are still left with the task of categorizing the offenders. Such decisions can be biased, as we have seen with the historically racially-biased system of applying the death penalty.
Jane, on the other hand, can be talked into anything. Indeed, James talks her into killing Jonah, who is 4’11”. Both are convicted of first degree murder. As a part of their punishment, the court requires that they submit to ‘aggression-elimination’ surgery, which in most cases effectively reduces violent recidivism rates to almost zero, before they are released after serving their 14 year prison sentences.

Now, James would have continued to kill short people once he was released. (Remember, he is just that hard-headed sort of person who is determined to let his hatred for short people guide his acts.) Thus, the surgery does indeed alter James’ character in a way that any traditional sort of rehabilitative programming, which respected the boundaries of agency, would not.

Similarly, Jane’s character is also changed by the surgery: Jane may, or may not have recidivated depending upon what sort of crowd she fell in with after being released. Her wishy-washy character would be fundamentally changed by the surgery, at least with regard to aggressive acts.

One might argue that it isn’t such a bad thing to eliminate these persons’ ability to choose to kill, or that they ‘gave up’ the right to maintain a certain type of character when they committed a murder. First, I fundamentally disagree: one never gives up their right to be a certain sort of person, even if they give up the right to live freely amongst others as that sort of person. Second, just as any sort of castration impacts all sexual expression, not just criminal sexual expression, the sort of surgery described above impacts all use of aggression – even when, let’s say, one needs to be aggressive to defend one’s life.

V. Conclusion


