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Addiction in public health and criminal justice system governance: neuroscience, enhancement and happiness research

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Abstract

Present regulations and prohibitions relating to psychoactive substances rest upon socio-historically contingent and hence arguably irrational foundations. New evidence bases located in post-genomic genetics and neuroscience hold the potential to disrupt them through demonstrating a lack of congruence between the regulations and prohibitions and the alleged and actual harms. How far might we use such knowledge to drive policy? What limits, if any, should be placed on our choices, and what attempts to influence these may be seen as acceptable? This article seeks to address these questions in relation to criminal justice system and public health governance of psychoactive substance use. It will explore the implications of justifications employed in both areas to restrict free choice on the grounds of harm to the self and to others. The central argument made is that the current categorisation of psychoactive substances as lawful or unlawful is likely to become disrupted as the result of several separate discourses which converge over psychoactive substance use: enhancement, cognitive liberty and the degree to which subjective experiences of pleasure, well being and happiness might enable us to improve and maintain our health as individuals and that of society as a whole. In my view, the strategic deployment of concepts of addiction which has enabled the public health and criminal justice systems to be able to share governance over psychoactive substance use is likely to become destabilised by these discursive developments. In that policy in the United Kingdom and elsewhere now draws upon happiness research, while reformers advocate freedom of choice over means of enhancing our states of being, a new focus upon the rational evaluation of psychoactive substances governance seems plausible.

Introduction

This paper will explore the impact of happiness research, cognitive liberty, enhancement, post-genomic genetics and neuroscience discourses on strategic deployment of concepts of addiction in public health and criminal justice system governance. Current thinking frames governance over citizens in neo-liberal consumer societies as resting upon our making rational choices over consumables and activities in the name of freedom in order to maximise our health, wealth and happiness.[1] These aspirations may conflict. Research reveals that although if we are unemployed or in ill-health we are less likely to be happy, once we have achieved a modicum of wealth becoming richer renders us only slightly happier, whereas psychoactive substances and activities may increase our happiness, but only sometimes our health.[2] Psychoactive substances, or those which alter the way our minds function and how we feel, are diverse. Any substance ingested, like food, and many activities, like exercise, alter our moods and hence how we perceive the world and experience our lives. Some, like opiates, may make us feel better in a dual sense, in that they may form the basis of medical treatment as well as enhancing our subjective experiences. Yet when many are taken to excess, feeling good may turn to

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feeling bad. Too much sugar makes us sick, too much amphetamine makes us paranoid and too much exercise makes our joints give out.

This complex potential renders psychoactive substances uniquely central to governance strategies which focus upon inculcating rational choice. Both public health and criminal justice systems rely upon justifications of harm to oneself or to others and notions of addiction to regulate or prohibit our consumption of psychoactive substances. Training us to eschew the short-term pleasures of a sugar rush for the long-term happiness of good health provides a template for rational consumer choices and the conservation of healthcare resources. Coding pleasure as risk encourages us to measure enjoyment in terms of degrees of harm posed to ourselves and to others. Thus we should calculate that the pleasure obtained from too much of a lawful psychoactive substance, or any amount of an unlawful one, leaves us vulnerable to risks associated with addiction and/or criminal liability. Yet present regulations and prohibitions relating to psychoactive substances rest upon socio-historically contingent and hence arguably irrational foundations. Thus new evidence bases located in post-genomic genetics and neuroscience hold the potential to disrupt them through demonstrating a lack of congruence between the regulations and prohibitions and the alleged and actual harms.

How far might we use such knowledge to drive policy? What limits, if any, should be placed on our choices, and what attempts to influence these may be seen as acceptable? This article seeks to address these questions in relation to criminal justice system and public health governance of psychoactive substance use. It will explore the implications of justifications employed in both areas to restrict free choice on the grounds of harm to the self and to others. The central argument made is that the current categorisation of psychoactive substances as lawful or unlawful is likely to become disrupted as the result of several separate discourses which converge over psychoactive substance use: enhancement, cognitive liberty and the degree to which subjective experiences of pleasure, well being and happiness might enable us to improve and maintain our health as individuals and that of society as a whole. In my view, the strategic deployment of concepts of addiction which has enabled the public health and criminal justice systems to be able to share governance over psychoactive substance use is likely to become destabilised by these discursive developments. In that policy in the United Kingdom and elsewhere now draws upon happiness research, while reformers advocate freedom of choice over means of enhancing our states of being, a new focus upon the rational evaluation of psychoactive substances governance seems plausible. In addition, policy moves to encourage the biotechnological industry to join public/private partnerships, taken together with the commercial potential of 'biovalue',[3] or profit generated by products anchored in the biological characteristics of life itself, enhancement technologies and 'cosmetic neurology', provide an economic environment hospitable to this.[4]

Policy, happiness research and harm to oneself and to others

Deriving the normative from evidence bases poses perils for policymakers. Yet, nonetheless, recent calls for them to draw upon national indicators of subjective wellbeing, or how people evaluate their lives in terms of happiness, to craft policies which will maximise happiness are proving increasingly influential.[5] For instance,

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governance in the United Kingdom has been informed by the work of Professor Lord Richard Layard, who has reread utilitarianism in the light of neurochemical and social science research to provide a justification for recommending wide ranging policy changes such as minimising income and social inequalities in order to maximise our health and happiness.[6] He contends that since we innately seek to feel good, and experience happiness, pleasure or wellbeing through altruism, trust and fellow feeling, policies which support our happiness when this does not harm either us or others may promote individual and social flourishing.[7] Not only does happiness cause success,[8] both feelings of happiness in the sense of pleasure, as well as the eudaimonic wellbeing we experience when our lives make sense to us, are good for our health.[9]

Nonetheless, not all happinesses are equal. For instance, as those involved in public health and criminal justice system governance wish us to maintain our health and to remain within the law, we must be persuaded to find happiness in choosing to consume carrots rather than cake or crack cocaine. Such decisions are commonly distinguished in terms of sub-optimal choices of short-term pleasures as opposed to rational adherence to practices promoting long-term happiness. Thus policymakers are likely to seek to influence how we define and experience happiness as opposed to pleasure, and may take a pick and mix approach to the results of research according to how well these match their political views.[10] Although happiness researchers may disagree over how far policy interventions should engage in social engineering to modify our less than optimal choices, governance inevitably seeks to shape them.[11] Thus while proposals by the Secretary of State for Health to raise our levels of happiness and conserve healthcare resources by restoring our mental health, getting us off incapacity benefits and back into the workplace as advocated by Lord Layard demonstrate the potential for post-genomic genetics and neuroscience to anchor public health and social policy, they also suggest how far this potential might support coercive social measures.[12]

Nor is drawing upon happiness research as a basis for policy measures straightforward where criminal justice system policy over psychoactive substances is concerned. Whereas Lord Layard's proposals rest upon demonstrable measures of happiness which permit a degree of normative extrapolation, many things which make us happy or provide us with pleasure are criminalised. Some sanctions may be justified in terms of harm caused to others: while my happiness might be increased by my stealing your Ferrari Testarossa, this would cause you harm so I should be punished or deterred from doing so. Other offences may provide happiness without necessarily harming others. Many clubbers who take ecstasy achieve happiness without apparent damage to themselves or others, or, at the very least, with less harm than that caused to and by those who consume alcohol within the law. While Lord Layard has adverted to this issue in passing, it has not formed a major focus of his rereading of utilitarianism.[13] Nonetheless, it has anchored other initiatives which seek to reform the present categorisation of psychoactive substances as legal or illegal. Supporters of legalisation or decriminalisation of at least some currently unlawful psychoactive substances allege that the harms caused by rendering certain drugs illegal far exceeds that the drugs themselves might pose to individuals who consume them or to society at large, although many regard this claim as unproven or unproveable.[14]

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Current controversies over the ethics of human enhancement approach the area of harm and psychoactive substances from a different perspective. Pharmaceuticals which hold the promise of making us 'better than well' risk being proscribed as designer drugs unless they can be sold as medicines.[15] Thus they have the potential to alter our perception of what it is to be healthy. In that they may be made available to the public only via prescription, their manufacturers promote them as medications to treat a plethora of new 'lifestyle' disease entities such as female sexual dysfunction, allegedly experienced by almost 50% of women.[16] Underpinning this situation is the assumption that while we may ethically intervene in order to remedy harms such as illness to restore sufferers to a state of natural health, to seek to move beyond therapy to enhance our capacities, particularly where this involves irreversible change, is selfish, unfair, threatens human nature and compromises human dignity.[17] This stance has been challenged. Those who favour enhancement see anti-meliorist views as philosophically suspect bioconservatism, based upon overly narrow conceptions of humanity, dignity and autonomy.[18] Transhumanists, characterising humanity as a work in progress, assert a right to self-transformation which may or may not involve psychoactive substance use.[19]

Such a right is allied to that put forward by supporters of cognitive liberty, who argue that the First Amendment on Freedom of Thought of the United States Constitution is 'meaningless without an inherent right to autonomy and self-determination over one's own functional neurochemistry'.[20] This right would entail not only the right to autonomous decisions over consuming psychoactive substances but also the ability to refuse pharmaceutical intervention in the form of compulsory pharmacotherapy, such as vaccines which would block the pleasure inducing effects of illegal drugs.[21] Claims to a right to cognitive liberty also draw upon post-genomic genetics and neuroscience to assert aspirations to enhancement by pharmaceutical means. Exercising such rights or aspirations may well involve the consumption of unlawful psychoactive substances, yet prohibiting our doing so is alleged to be difficult to justify in terms of harm to others outweighing our freedom to seek personal happiness. Indeed, the notion of harm may be deployed to suggest that we suffer significant harm if we are prevented from exercising rights to autonomy over how we pursue happiness, self-transformation and cognitive liberty.

Thus post-genomic genetics and neuroscience reveal potentials for us to reinvent ourselves, to enhance our happiness, health or humanity and to experience cornucopias of pleasures. As Wolpe explains, '[n]eurological biotechnologies differ from others in that they ask us to explicitly consider the kind of 'self' we want to have; or, to put it less dualistically, perhaps, the kind of self we want to be'.[22] In similar vein, the rereading of utilitarianism spurs us on to engage in choices which will maximise our happiness. Extant or future psychoactive substances afford us with opportunities to do so, yet our availing ourselves of these may conflict with public health and criminal justice system governance. Ways in which conceptions of addiction are used strategically to resolve or conceal these contradictions will now be explored.

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Post-genomic genetics, neuroscience and the governance of addiction

Criminal justice and public health governance both deploy the notion of addiction as a central trope. If we are seen as addicted, we have harmed ourselves through an unhealthy seeking after pleasure, and pose harm to others through placing excess burdens on healthcare resources, or committing crimes to fund our drug abuse. Yet classification of psychoactive substances as lawful (alcohol, nicotine), unlawful (cocaine) and/or medicinal (opiates, cannabis) is socio-historically contingent,[23] and fails to conform with their potential to harm our health.[24] Nonetheless, sizeable tax revenues from alcohol and tobacco, combined with international agreements mandating a war on drugs, have sustained a categorisation which conflicts with both the impetus to enhancement and with those who assert rights to cognitive liberty.[25] We, as self-reflexive citizens, are expected to exercise our wills judiciously, to choose lawful pleasures and to maintain healthy lifestyles. Those of us who do not are liable to be seen as engaging in sub-optimal choices, and to be condemned for losing control. [26] Should we be deemed to seek pleasure excessively or inappropriately through consuming unlawful psychoactive substances, we may be subsumed under criminal justice or public health models and punished or treated for addiction accordingly.

How far might post-genomic genetics and neuroscience anchor policy here? Some of us find ourselves unwilling or unable to restrict our pleasures. Research establishing the neurochemistry of reward pathways in the brain has associated this with genetic susceptibilities. Some of us are more likely to take risks to increase our stores of dopamine, some of us can resist psychoactive substances more than others and still more of us have difficulty changing patterns of consumption once they have become habitual. Views on how to characterise this vary over time and place. Moral censure and the involvement of the criminal justice system prevail where intoxications are associated with failures of the will, harmful impacts upon others and unlawful acts. Under a public health model, however, addictions are characterised as chronic, relapsing conditions which should attract treatment rather than punishment or incarceration.

Jurisdictions exercise governance through these alternative models in varying fashions, which impact upon specific groups in different ways, often commensurate with social stratification.[27] In addition, in the United States the emphasis upon the war on drugs has fostered a framing of unlawful psychoactive substance use within the criminal justice paradigm of punishment as prevention of harm to others, on the assumption that many offend in order to support drug abuse. Treatment programmes for offenders operate under the aegis of the drug courts, with the aim of eradicating both habits. Elsewhere, particularly in Europe and the Antipodes, the harm reduction movement leans more towards the public health treatment model. Here reducing harms to users and others is fostered by treatment programmes and measures which provide support for those using unlawful drugs, such as providing them as part of medical treatment.[28] The United Kingdom draws from both approaches.

What impact should the revelation of varying genetic susceptibilities to different forms of addiction have upon offenders? Should my liability for breaking the law be tempered by the fact that my genetic make-up and neurochemistry incline me towards taking undue risks, thereby making unlawful psychoactive substance use more of a

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temptation? How far should my lowly social status, statistically correlated with my risk profile, be taken into account? Classically the criminal justice system has been unwilling to allow evidence of genetic or biological variations to influence ideas of culpability. Where sentencing options are concerned, however, offenders who are categorised as suffering from addictions may be offered treatment for these, often within contexts which are presented as therapeutic. Civil liberties protections may be waived by the offenders, while the penalties of incarceration recede where judges consider that a cure against re-offending based upon addiction has taken place. Misgivings have been expressed over the assertion of biological culpabilities as justifying the removal of such crucial protections.[29]

While the DSM-IV-R uses the more recent clinical term drug dependence to classify those who are deemed to overuse or abuse psychoactive substances, neuroscientists continue to favour the label of addiction as denoting neural adaptations which foster a loss of control over urges to take a drug. Within this model, the pleasure which comes from taking psychoactive substances tempts us to do so excessively. If we do, our volition may be compromised as pure psychoactive drugs 'bypass adaptive information processing systems and act directly on ancient brain mechanisms that control emotion and behaviour'.[30] Even where homeostatic mechanisms within the brain ensure that we no longer experience pleasure from consuming the drug, once we are addicted we crave it nonetheless, so that our ability to decide not to take it, not to damage the rest of our life by seeking it out, or to enjoy the ordinary pleasures of life becomes seriously compromised.[31] Hence drug addiction is characterised as 'a chronic, relapsing disorder in which compulsive drug seeking and drug taking behaviour persists despite serious negative consequences. … Continued use induces adaptive changes in the central nervous system that lead to tolerance, physical dependence, sensitisation, craving and relapse'.[32]

It is currently estimated that genetic factors account for 40-60% of vulnerability to addiction, either as genetic variations, through gene-environment interactions or via variable metabolism of drugs or sensitivity to their effects.[33] Rewarding experiences associated with drugs or with what is usually termed 'natural' rewards, ie other pleasure inducing substances or activities such as sugar or sex, produce similar effects in the brain. It seems likely that all drugs which are subject to abuse share common neural and molecular pathways which provide reward and promote addiction.[34] Thus, as identifiable neuronal mechanisms underlie rewards, craving, relapse and the disruption of the ability to experience pleasure, addiction 'is best conceptualised as a disease of brain reward centres that ensure the survival of organisms and species'.[35] From this perspective, volition is compromised by neuroadaptations associated with addiction which induce relapse.[36] Both patients with damage to the ventromedial prefrontal cortex, the part of the brain associated with reflective decision-making, and those addicted to substance abuse persistently engage in choices which lead to significant harms in their lives. Neural mechanisms which enable the amygdala system, a part of the brain involved in the experience of pain and pleasure, to hijack the capacity to abjure short term gains for long term goals as a result of addiction have been put forward as an explanation for addicts' loss of will power.[37] Thus compulsive drug-seeking and drug-taking behaviour is facilitated by difficulties in decision making and a compromised ability to judge the consequences of one's own actions.

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These genetic and neuronal effects on the wills of those suffering from addiction have obvious implications for the criminal justice system, where punishment is coded to mens rea, or volition. Punishment for voluntary prohibited actions preserves the viability of social groups by curtailing the activity of free riders, and may precede reintegration.[38] However, the extent to which prohibited actions may be considered sufficiently volitional to attract punishment within the criminal law is problematic. New neuroimaging technologies suggest that the genomic and genetic underpinnings of choice may undercut current notions of moral responsibility. Nonetheless, these do not at present indicate mental states at times crimes are committed.[39] Mental condition defences are based upon the materialist assumption that abnormalities or diseases of the mind may be located in malfunctions of the brain.[40] Yet even materialist evidence of brain functioning may be difficult to interpret in these terms. How useful, then, are neuroscientific explanations and technological possibilities for criminal justice systems wherein offenders may be seen as addicted?

A salient caveat here is the increasing complexities revealed by post-genomic genetics. The subtleties of varieties of gene expression, how each variation may result in differing behaviours and the ways in which epigenetics has demonstrated that environment may impact on inherited characteristics all make it clear that straightforward assertions of genetic cause and effect cannot be put forward convincingly.[41] Correlation and statistical associations between biology and behaviour, however, produce hypotheses of possible mechanisms here, many of which are gradually being bolstered by ongoing research. This picture is complicated where investigations of addiction to psychoactive substances are concerned. Much of the extant knowledge of the neuroscience of addiction, neurotransmitters in general and the impact on behaviour comes from the use of animal models.[42] Ethical factors restrict the range of investigations which would be approved for human subjects. Varieties of effect and mechanism exist amongst different species of non-human animals, between these and humans, and amongst humans.

Much of the research involving human subjects where dependence upon psychoactive substances is being investigated is also complicated by the fact that many of these substances are unlawful. Access to the both subjects and substances is thus compromised. Even where human subjects are available, the fact that many who are seen as abusing psychoactive substances suffer from various co-morbidities, such as mental illness, renders verification of comparisons and conclusions difficult. Indeed, one of the commonly accepted rationales for co-morbidity is that substance abuse represents an attempt to self-medicate by those experiencing uncomfortable mental states.[43] A further obstacle is that those who depend upon psychoactive substances tend to avail themselves of more than one, rendering generalisations over the effect of a specific substance problematic.[44] Accordingly, assertions about the neuroscience of criminal responsibility, pleasure and addiction rest upon suggestive rather than certain scientific foundations. To claim otherwise would be to engage in what Healy has condemned as biobabble.[45] In addition, there are obvious philosophical difficulties inherent in connecting biological substrates with both subjective experiences and conscious and volitional actions.[46] Although as outlined above Lord Layard's rereading of utilitarianism, based partially on neurochemical evidence, has influenced policy in the United Kingdom, many philosophers and ethicists contend that it is both impossible and inappropriate for neuroscience to be seen as providing the potential to replace normative questions with scientific ones.[47]

What, then, might the neuroscience and post-genomic genetics associated with psychoactive substance use contribute towards criminal justice system governance? Evidence of compromised volition seems unlikely to overturn present interpretations of mens rea, or criminal responsibility, in the near future. Yet, where this may be interpreted as addiction, a disease in need of treatment, it can be framed in terms of its constituting harm to oneself and one's health, as well as a motivation for harm against others in the sense of crimes against property or persons embarked upon in order to sustain unlawful psychoactive substance use. Criminal justice system and public health governance thus converge over the treatment of offenders who may be classified as addicts. It is to this territory I now wish to turn.

Addiction in public health and criminal justice system governance

Both public health and criminal justice authorities possess coercive powers. Should serious infectious diseases threaten us, we may be segregated, forcibly treated and incarcerated in order to protect the rest of the populace. Similar mechanisms ensure that offenders are imprisoned and punished. Ideally, overreaching of these powers is kept in check by human rights and civil liberties procedural protections. While public health and criminal justice both possess claims to heal individuals and society at large, then, these are underpinned by significant access to lawful force. We may be compelled to accept treatment or punishment when the larger interests of society are seen as being at stake. It is these wider social interests which purportedly underlie public health and the criminal justice system's classification of some pleasures as preferable or lawful. For example, the endogenous opiates we produce through exercise are to be encouraged, whereas the exogenous equivalents we may purchase in the form of heroin are to be prohibited in part because we may commit crimes to fund our habit.

Nor are all lawful sources of neurochemicals seen as equivalent. Public health's concern with resource allocation and the consequences of overindulgence in lawful psychoactive substances such as alcohol, nicotine and food has resulted in policies which seek to moderate our access to them. Restrictions upon places where one might smoke, raising taxes on alcohol and the proscription of certain types of food being sold in schools are some recent examples. Criminal justice policies aim to prohibit or to exact retribution for the consumption of unlawful psychoactive substances. Public health and criminal justice system approaches overlap where offenders are directed towards programmes which purport to treat addictions. Here the procedural protections associated with civil liberties within the criminal justice system are typically relaxed. Participants, in effect, are offered the choice of defining themselves as ill or bad, ie as suffering from addiction as a chronic, relapsing disease or as wilfully engaging in prohibited behaviours which damage both themselves and the larger social fabric. In this light, those who complete the therapeutic programmes successfully escape punitive measures such as incarceration, whereas those who fail to complete are subjected to them.[48] The neuroscience of addiction traversed above offers supplementary measures of treatment which give rise to concerns over the civil liberties of those offenders who may become subjected to them.

Medications which remove the rewards or stimulate unpleasant side effects when specific psychoactive substances are taken, or vaccinations with similar effect, are

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potential forms of compulsory treatment for both actual and potential offenders. Thus individuals with genetic formations associated with a predisposition towards addiction, particularly children, may receive vaccinations, with or without consent, as a preventative measure. Analogies with allegations of the over-prescription of ritalin, tranquillisers and anti-depressants forming part of public health governance are clear. Compulsory treatment, the use of neuroscientific technologies to identify actual and potential offenders and the compromised capacity of vulnerable offenders and minors to consent to such treatment raise separate ethical issues. As these have been explored elsewhere, they will not be considered further here.[49] Hence the definition of addiction as disease, especially when in the context of criminal justice system proscription, gives rise to significant misgivings over compulsory treatments. These acquire additional force from the spectre of relaxed civil liberties protections associated with treatment within the criminal justice system, suggesting prolonged and indefinite liabilities as a very real possibility.[50]

The reformatory force of public health and criminal justice system measures in this arena are aimed at encouraging those subjected to them to aspire to a model of self-reflexive micro-management where conditions defined as disease are eschewed, so-called cures embraced and experiences of pleasure subsumed within a civic aspiration to health. This model frames happiness as eschewing short-term pleasures and minimising harm to oneself or others. Both public health and criminal justice system governance thus characterise pleasure seeking where psychoactive substances are concerned in terms of curtailment. Finding too much pleasure in ‘excessive’ consumption of lawful substances, or in habitually resorting to those prohibited by the law, is deemed to be inappropriate. Yet, nonetheless, many of us continue to do so. At times, most of us choose pleasure over perfect health and virtuous self-restraint. Indeed, the proponents of cognitive liberty and human enhancement would argue that we should be free to direct our own choices here.

Models which seek to explain this seemingly irrational behaviour have veered between characterising it as moral weakness or a form of ill-health. Marianna Valverde has traced the historical transformations of alcoholism and other ‘diseases of the will’ in this light.[51] Recently, together with Pat O’Malley, she has elucidated how the experience of pleasure has been excluded from public health and criminal justice discursive strategies which seek to restrain our consumption of psychoactive substances via the rubrics of addiction and drug abuse.[52] In my view, however, the incorporation of neuroscience into policy discourse and the public imagination has now fostered a simultaneous resurgence and co-optation of pleasure which threatens this strategic deployment of notions of addiction.

Salutogenesis: the obligatory prudential transforming of pleasure

The impetus within public health policy to persuade us to eschew activities which pose risks to our health and espouse those which enhance it is associated with the concept of salutogenesis.[53] The opposite of pathogenesis, or the origins of ill-health, salutogenesis aims to delineate the origins of health and the means by which it might be ensured and maintained. Neuroscientific research has contributed to the salutogenic programme by revealing the extent to which pleasure not only enhances our health but forms a basis of our daily life. Endogenous opiates, for example, ensure that we enjoy

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one another's company, providing evidence for a postulated human trait of affiliation.[54] While the neurocircuits in the brain associated with functional salutogenic mechanisms that contribute to health via specific beliefs and practices are not yet well understood, associations between certain states of being or beliefs and practices and good health are now accepted. If we feel that life makes sense, that we can deal with its difficulties, and are able to love at least some of our lives, our gods and our fellow men and women, then we will be happier, more likely to be healthy than if we do not, and will recover better from ill-health. Psychoactive substances and practices may enhance or substitute for these factors. Thus, pleasure is good for us because it helps to make us happy and healthy. Lord Layard's rereading of utilitarianism rests upon this neuroscience of well-being and mood control. Public health and criminal justice systems wishing to draw upon pleasure as a means to promote health or discourage vice must thus move forward from the elision of pleasure from their discursive strategies noted by O'Malley and Valverde.

Hence, in my view, the neuroscience of salutogenesis, Lord Layard's rereading of utilitarian happiness and recent suggestions that susceptibility to becoming addicted to various substances, such as alcohol, or activities, such as risk-taking, may be associated with particular genetic formations have together supported a reframing of pleasure as the basis of neurochemical algorithms designed to maximise our health. A measure of the degree to which this has become part of popular culture is the daily exhortations in the tabloids to improve our looks and health by engaging in frequent sex with a regular partner,[55] to select foods which will maximise our mood enhancing neurochemicals,[56] to replace our addictions to obesity inducing serotonin imbued carbohydrates with the non-calorific mood enhancing endorphins to be found in regular cardio-vascular exercise,[57] or to log onto a National Health Service affiliated website which will advise us on techniques of sexual pleasure.[58] Public health campaigns encourage us to engage in daily rituals wherein subjective experiences of well-being through pleasure are fostered in order to maximise health. Here our pleasures are not inherently to be valued, but become subsumed within a public health imperative mandating self-reflexive salutogenesis as we become responsibilised to engineer and control our moods in order to ensure that we are as healthy as possible.

Rose has drawn attention to the degree to which the daily self-reflexive practices associated with the maintenance of health and the scrutiny of our inner lives constitute contemporary means of governance.[59] For our neurochemical selves,[60] prudential practices and rational choices associated with the discerning experience of pleasure have become daily obligations as we seek, responsibly, to maximise our health. Public health policy today expects biological citizens to manage their lives reflexively in ways which will maximise their health, longevity and well being.[61] Thus, despite genuflections towards the right not to know, we are responsiblised in terms of discovering our risk profiles, altering our lifestyle practices accordingly and attaining prudential mastery of the neurophysiology of mood maintenance. Under the model I have put forward, discourses of pleasure become part of a mandatory programme of self-maintenance which ensures our long-term health and happiness. Pleasure is experienced subjectively as a neurotransmitter symphony we conduct, pumping up the volume of serotonin via sex, carbohydrates or prozac. These prudential practices come under threat when our desires for pleasure are viewed as intemperate. Judicious moderation or modulation of neurochemicals becomes an essential literacy. Foucault's

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account of the uses of pleasure in classical Greece has at its centre an allied aesthetic.[62] Indeed, this still forms the basis of suggestions that youthful abusers of psychoactive substances might be persuaded to mend their ways by eschewing excess.[63] This aesthetics of moderation is threatened by excessive consumption, the location of pleasure in disapproved psychoactive substances and pleasure seeking habits which interfere with our ability to manage our daily life. It is here where public health and criminal justice framings of addiction and substance abuse become salient. In conclusion, I shall now explore how my portrayal of the discursive strategies over pleasure employed in public health and criminal justice policies may be integrated with recent critical theorising on neo-liberalism, governance and addiction.

Discriminating between pleasures, neo-liberal consumer society and addiction

Gerda Reith asserts that neo-liberal consumer society creates a fetishism of addiction as an artifact of discursive conflicts between consumption, freedom and governance.[64] In her view, citizens in such societies are responsibilised as self-reflexive consumers who are both constructed by their freedom to choose amongst commodities and constrained by their incapacity to escape the burdens associated with such unending rational choices. In these circumstances, the option of adopting the identity of an addict, whose ability to engage in volitional choices may be accepted as compromised, may prove all too tempting for many. Hence today there is a plethora of people defining themselves as addicted to food, sex, shopping, gambling and so forth. From this perspective, treatment for addiction becomes a means of returning weak-willed citizens to their self-reflexive responsibilities associated with consumer choice. The cyclic return of the self-actualising consumer, assuming control over life, is framed as a triumph over 'the daemonic force of addiction'.[65] Those who prove recalcitrant are subjected to the more explicit coercive powers of the criminal justice system.

In Reith's consumer society, freedom is read as freedom to consume. Hence dependence, or lack of freedom, is peculiarly abhorrent, and must be eschewed and condemned. As she explains,

> *'What is new in modern society is not the emphasis on issues of freedom per se, but rather the unprecedented emphasis on freedom as a mode of governance by and through the individual. Innermost states are the medium through which freedom is controlled, as well as the measure of its loss. Today we are governed not against but through our freedom, which is why its loss or vitiation is articulated in terms of its opposite'.*[66]

How does this fit in with pleasure? O'Malley and Valverde associate the elision of pleasure in liberal discourses of addiction with its subsumption within forms of rational and responsible enjoyment.[67] Agreeing with Fox that pleasure is read as risk in public health today, they characterise criminal justice policies embodied in the harm minimisation movement as based upon a rational choice actor performing the felicity calculus in order to avoid harms rather than to experience pleasures.[68] Hence, any right to pleasure within a consumer society is in tension with, but subservient to, the prudential duty to eschew risk. As they conclude,

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> *'Liberal government has thus accumulated a battery of pleasure-denying characterisations, each with its own discursive effectiveness, each linked with an appropriate set of governing techniques. Beastliness requires and justifies force and compulsions; compulsive behaviours trigger and validate therapeutics; free choice consumers require and are provided with information and skilling. Thus does liberalism arm itself with a multiplicity of responses, becoming potentially ever more flexible and adaptable in its capacity to govern without pleasure'.*[69]

My suggestion in this paper is that neo-liberal governance today has moved on from this position. In my view, it now draws upon healthcare's focus upon salutogenesis, post-genomic genetics and neuroscience to colonise pleasure as a means to ensure that rational consumers aspire both to maintain neurochemical mood control and to apply the aesthetic of moderation to the consumption of lawful psychoactive substances in ways which will maximise health. From this perspective, liberalism as portrayed by Reith, O'Malley and Valverde governs not without but through both freedom and pleasure. Addiction accepted as a chronic relapsing disease provides a rationale for a cyclic progression of citizens from the rigours of rational consumption to the shriven status of the sick, before their return from excess to self-reflexivity. Yet while the evidence from post-genomic genetics and neuroscience provides some support for the extension of notions of addiction to ordinary activities like shopping and sex, it also undermines the designation of specific psychoactive substances as lawful or unlawful on the basis of harm read as addiction. If almost everything we imbibe or do has addictive potential, the grounds upon which some things might be prohibited become problematic unless reasons other than addiction are proffered and proven.

This presents many possible future scenarios. Two extremes will be sketched out here. Should notions of addiction be extended to cover prohibitions on specific psychoactive substances according to their potential for harm, an expansion of both criminal justice system and public health governance might be anticipated. An increasing number of us would be designated as suffering from conditions requiring treatment. Pharmaceuticals providing alternative means of experiencing pleasure, or of blocking the pleasure-inducing effects of prohibited psychoactive substances, would be characterised as medication. Avenues for enhancement and claims of cognitive liberty would not be favoured. Alternatively, should the latter prove successful, pharmaceuticals enabling us to experience a range of pleasures or abilities, ideally with potentially harmful side effects being blocked, would be made available in pure, regulated form. Any psychoactive substances posing irrevocable harm to others, like arsenic, would continue to be subjected to safeguards in keeping with the criminal justice system's protective functions.

The disruption of the present systemic inconsistencies of the classification of psychoactive substances as lawful or unlawful which I have argued is catalysed by post-genomic genetics, neuroscience, happiness research, salutogenesis, and the discourses of pleasure, enhancement and cognitive liberty is inevitable under either scenario sketched out above, as well as in a range of others. Which will prove the more likely would appear to hinge upon the future relationship between ideas of freedom, medicalisation, pleasure and prohibition on the basis of harm. A crucial factor in determining which possible scenario will come into being will be the commodification of health. Part of the governance of freedom in neo-liberal society is

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the investment of commercial third parties, often in public/private partnerships, in the 'shaping of the intimate', the construction of disease entities and a commodification of the means by which these might be treated.[70] Risk societies and the health practices of individuals managing their risky selves have given rise to opportunities wherein biovalue might be generated. Such commercial ventures offer biological citizens a plethora of consumer choice in the form of genetic tests, pharmacogenetically tailored pharmaceuticals and neurochemical means by which we might enhance our mood control.[71]

Nor are the law abiding self-reflexive citizen consumers the only market for the products of biovalue. Pharmaceutical companies' interests in providing medication on a large scale at a time when many patents for major drugs are running out have influenced how drugs are marketed, as well as the creation of novel disease entities such as female desire dysfunction disorder.[72] Thus the size of the criminal justice system as a potential market for drugs which target neurochemistry associated with addiction is a substantial incentive to produce valuable additions to the arsenal of governance in the form of magic bullets like ritalin, which attract blanket prescription for behaviour which may be regarded as socially unwise. Under the first scenario, then, the likelihood of inappropriate medication of vulnerable offenders within the criminal justice system, and the 'prophylactic' treatment of those who are viewed as at risk of addiction, seems high. In that version of neo-liberal consumer society, a restricted range of pleasures, those which are lawful and do not make us fat, unhealthy or unhealthily unhappy, or in which we do not indulge to excess, would be made available to us within the commercial sector. Medications or medical treatments which restored those of us who slipped on primrose paths to return to the straight and narrow would be made available through the public health or the criminal justice system. Here the confluence of public health's disease model of addiction, public health powers of compulsion, the criminal justice system's orientation towards reintegration and retribution and simplistic applications of genetic and neurochemical knowledge, taken together, would constitute an impetus towards coercive treatment of so-called addicts and potential addicts which would threaten to overcome civil liberties protections.

Yet the catalysts explored above suggest that if our behaviour in relation to psychoactive substances is examined in the light of happiness research and neuroscience, most of us find ourselves happy enough without excessive striving in a companionable sort of fashion, and prefer to make up our own minds about which pleasures we choose. Hence arguments based upon enhancement and cognitive liberty discourse are likely to prove appealing to many. Insofaras we may purchase access to pleasure as a method of achieving health, we are fulfilling our dual responsibilities as consumer and healthy citizen. When we pay for a year's gym membership in order to maintain cardio-vascular fitness, the self-interrogation practice we engage in before doing so exemplifies this duality. We might weigh up the merits of gym membership against liposuction in terms of cost and health benefits before choosing the former. Many of us have no doubt traversed these decisions and transactions, particularly in the New Year. But most of us fall by the wayside. Almost all gym memberships lapse after the first three weeks. In similar fashion, the vast majority of us who embark upon diets of one sort or another abandon them and become fatter, despite a billion dollar industry selling us diets and fitness, in tangent with millions of pounds spent on

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public health exhortations to amend our ways. Does this mean we must be fixed with the cyclic identity of addicts in order to excuse our lack of will power, as Reith contends? Or might happiness research, taken together with aspirations to enhancement and cognitive liberty provide an alternative way forward?

Happiness research can be read as encouraging communitarian as opposed to consumerist ideals. The ability to locate pleasure outside judicious rational consumption is applauded by Lord Layard. In his view, '[o]ne central fallacy is to think that our lives should be organised for the benefit of ourselves as consumers. We are both consumers and producers and it makes no sense to produce a wonderful material lifestyle, even wonderful health services for the population, if we as workers and producers are becoming more miserable'.[73] Characterising addiction to alcohol (and, by extension, other addictions) as a 'very meaningful indicator of unhappiness'[74], he asserts that neurochemical and social science demonstrate that self-advancement as a primary aim leads to anxiety, and that happiness is to be found through assisting others as well as oneself. Hence the task of policy makers is accepting that all humans are of equal moral worth and working to maximise human happiness via distributive justice. From this perspective, the cycle of addiction, medicalisation and governance constrained choice described by Reith would become disrupted as we found happiness in terms of both pleasure and eudaimonic meaning through altruism, affiliation and limiting consumption. A view of one another as possessing equal moral worth also supports claims that we should be free to choose means by which to enhance our lives as an exercise of cognitive liberty. In this scenario, then, the biotechnological industry would be free to develop products which produced pleasure or enhanced capacities within regulatory safeguards without the need to promote these as medications for constructed diseases. Nations would prosper from revenue accrued from taxing such products as well as from savings in the criminal justice system budget. We as citizens could engage in rational evaluation, choice and experience of pleasure to achieve eudaimonic meaning in our lives.

Conclusion

I have argued that neuroscience, happiness research, salutogenetic public health policies and the commercial potential of biovalue have contributed towards a situation where an explicit focus upon health as both commodity and means of governance entails public health policies which promote self-reflexive practices involving the measured manipulation of mood as not only permissible but obligatory. The strategic use of notions of addiction, risk and drug abuse have been used to anchor an elision of pleasure from past discursive strategies which have sought to promote the virtues of self-restraint essential for prudential self management, as neo-liberal governance frames resistance to these as weakness or crime. Reading health as both a commodity and a means of governance in neo-liberal consumer society means that treatment succeeds when we return to practices involving consumer choice.

The relationship between pleasure and health is problematic for both public health and criminal justice policies as they seek to delineate boundaries of permissibility surrounding psychoactive substances which promote pleasure. When pleasure is framed as both salutogenic and pathogenic, as where, say, orgasms provide endorphins which enhance our immune systems but sugar promotes diabetes, the need

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to regulate the self-reflexive consumption of pleasure becomes acute. Information supplied for this purpose creates a rational interrogation of pleasures and their effects which, when applied to criminal justice system prohibitions on the use of psychoactive substances, reveals systemic inconsistencies. This encourages the framing of the consumption of psychoactive substances as more appropriately falling within the public health rather than criminal justice sphere of influence. Besides this, it adds force to the movement to decriminalise at least some prohibited psychoactive substances, and suggests that pharmaceuticals created in order to enhance our capacities or improve our moods to render us better than well might now be categorisable as virtuous salutogenic medications rather than vice-ridden designer drugs. Pharmaceutical manufacturers anxious to exploit biovalue fully, as patent protections run out, are likely to press for supportive reclassification here.

Thus the fragile accord between public health and criminal justice system policies becomes disrupted, whereupon the potential for re-evaluation of a range of pleasures, and the creation of new means to achieve them, is a plausible outcome. Rationales located in Layard's rereading of utilitarianism, together with claims of cognitive liberty and the movement towards enhancement hold promise here. Perhaps, then, our notion of health, happiness, pleasure and criminal justice may become fleshed out to incorporate the complexities and ambivalences of our lived worlds.

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[1] G. Reith. Consumption and its Discontents: Addiction, Identity and the Problems of Freedom. British Journal of Sociology 2004; 55: 283-300.

[2] R. Layard. 2005. Happiness: Lessons from a New Science. London, Penguin.

[3] C. Waldby. Stem Cells, Tissue Cultures and the Production of Biovalue. Health 2002; 6: 305-323.

[4] Foresight Brain, Science, Addiction and Drugs Project http://www.foresight.gov.uk ; A. Chatterjee. Cosmetic Neurology: the Controversy Over Enhancing Movement, Mentation and Mood. Neurology 2004; 63: 968-974.

[5] http://www2.warwick.ac.uk/fac/soc/economics/staff/faculty/oswald/fthappinessjan96.pdf.

[6] Layard, op. cit. note 2.

[7] Ibid.

[8] S. Lyubomirsky et al. The Benefits of Frequent Positive Affect: Does Happiness Lead to Success? Psychological Bulletin (2005); 131: 803-855.

[9] R. Ryan and E. Deci. Of Happiness and Human Potentials: a Review of research on Hedonic and Eudaimonic Well-Being . Annual Review of Psychology 2001; 52: 141-166.

[10] M. Easton. The Survival of the Happiest. New Statesman 24 April 2006 http://www.newstatesman.com/200604240016

[11] A. Stutzer and B. Frey. (2006) What Happiness Research Can Tell Us About Self-Control Problems and Utility Misprediction. Zurich, Institute for Empirical Research in Economics.

[12] F. Elliott and S. Goodchild. Prozac Nation. Independent on Sunday, 15 April 2006: 1-4.

[13] R. Layard. (2003) Lionel Robbins Memorial Lectures 2002/3. London, London School of Economics http://www.vwl.uni-mannheim.de/stahl/tobi/happy.pdf at 13; N. Pearce. In Conversation with Professor Richard (Lord) Layard. Public Policy Research 2005; 12: 188-95 at 190; Layard, op. cit. note 2 at 205-21.

[14] R. MacCoun and P. Reuter. 2001. Drug War Heresies: Learning from Other Vices, Times, and Places. Cambridge, Cambridge University Press, J. Inciadi. 1999. The Drug Legalization Debate.. New York, Sage. M. Grosman et al. Illegal Drug Use and Policy. Health Affairs 2002 ; 21 : 134-145.

[15] Jenkins, P. (1999) Synthetic Panics: Symbolic Politics of Designer Drugs. New York, New York University Press.

[16] See April 2006 special issue of PLOS Medicine at http://medicine.plosjournals.org/perlserv/?request=index-html&issn=1549-1676

[17] G. Annas et al. Protecting the Endangered Human: Towards an International Treaty Prohibiting Cloning and Inheritable Alternations. American Journal of Law & Medicine 2002; 28: 151-173, F. Fukuyama. 2002. Our Posthuman Future: Consequences of the Biotechnological Revolution. London, Profile, L. Kass. 2002. Life, Liberty and the Defence of Dignity San Francisco, Encounter, P. Lauritzen. Stem Cells, Biotechnology, and Human Rights: Implications for a Posthuman Future' Hastings Center Report 2005; 35;: 25.-34, President's Council on Bioethics. 2003. Beyond Therapy: Biotechnology and the Pursuit of Happiness Washington, PCB.

[18] A. Caplan and C. Elliott. Is It Ethical to Use Enhancement Technologies to Make Us Better Than Well? 2004; 1: http://medicine.plosjournals.org/perlserv?request=get-document&doi=10.1371/journal.pmed.0010052 , M. Smith. Saving Humanity: Counter-Arguing Posthuman Enhancement Journal of Evolution and Technology 2005; 14: http://jetpress.org/volume14/smith.html .

[19] N. Bostrum. In Defence of Posthuman Dignity Bioethics 2005; 19: 202-221, M.C. Roco and C.D. Montemagno. (2004) The Coevolution of Human Potential and Converging Techologies. New York, New York Acadmey of Sciences, G. Stock. 2002. Redesigning Humans: Choosing Our Children's Genes. London, Profile.

[20] W. Sententia. Notes From the Director. Cognitive Liberty 2003; 4: 7-13 at 7.

[21] Center for Cognitive Liberty. (2004) Pharmacotherapy and the Future of the Drug War. Davis, CA, CCLE.

[22] P.R. Wolpe. (2002) Treatment, Enhancement and the Ethics of Neurotherapeutics' Brain and Cognition; 50: 387-395 at 394.

[23] V. Berridge and T. Hickman. (2005) History and Future of Psychoactive Substances. Foresight Brain, Science, Addiction and Drugs Project http://www.foresight.gov.uk.

[24] World Health Organisation. (2004) Neuroscience of Psychoactive Substance Use and Dependence. Geneva, World Health Organisation.

[25] D. Turner and B. Sahakian. Neuroethics of Cognitive Enhancement. BioSciences 2006; 1: 113-123.

[26] Stutzer and Frey, op. cit. note 11, Reith, op. cit. note 1.

[27] P. O'Malley and M. Valverde. Pleasure, Freedom and Drugs: the Uses of 'Pleasure' in Liberal Governance of Drug and Alcohol Consumption. Sociology 2004; 38: 25-42.

[28] Room, R. (2005) Social Policy and Psychoactive Substances. Foresight Brain, Science, Addiction and Drugs Project http://www.foresight.gov.uk.

[29] N. Rose. The Biology of Culpability: Pathological Identity and Crime Control in a Biological Culture. Theoretical Criminology 2000; 4: 5-34.

[30] R. Nesse and K. Berridge. Psychoactive Drug Use in Evolutionary Perspective. Science 1997; 278: 63-68 at 68.

[31] G. Koob and M. Le Moal. Plasicity of Reward Neurocircuitry and the 'Dark Side' of Drug Addiction. Nature Neuroscience 2005; 8: 1442-1444.

[32] N. Volkow and T-K. Li. The Neuroscience of Addiction. Nature Neuroscience 2005; 8: 1429-1430.

[33] Ibid.

[34] E. Nestler. Is There a Common Molecular Pathway for Addiction? Nature Neuroscience 2005; 8: 1445-1449.

[35] C. Dackis and C. O'Brien. Neurobiology of Addiction: Treatment and Public Policy Ramifications. Nature Neuroscience 2005; 8: 1431-1436 at 1431.

[36] Y. Shaham and B.T. Hope. The Role of Neuroadaptations in Relapse to Drug Seeking. Nature Neuroscience 2005; 8:1437-1439.

[37] A. Bechara. Decision Making, Impulse Control and a Loss of Will Power to Resist Drugs: a Neurocognitive Perspective. Nature Neuroscience 2005; 8: 1458-1463.

[38] B. Semour et al. The Neuroscience of Punishment. Paper presented at Law, Mind and Brain:

Interdisciplinary Colloquium, London, February 2006; and M. Hoffman. The Evolution of Retribution. Paper presented at Law, Mind and Brain: Interdisciplinary Colloquium, London, February 2006.

[39] D. Mobbs et al. The Implications of Brain Imaging Studies for the Law. Paper presented at Law, Mind and Brain: Interdisciplinary Colloquium, London, February 2006.

[40] L. Claydon. Problems of Mind, Body and Brain in the Criminal Law. Paper presented at Law, Mind and Brain: Interdisciplinary Colloquium, London, February 2006.

[41] D. Ball et al. Genomics. Foresight Brain Science, Addiction and Drugs Project http://www.foresight.gov.uk/Brain_Science_Addiction_and_Drugs/index.html

[42] Dackis and O'Brien, *op. cit.* Note35.

[43] Mental Health Foundation. (2006) Cheers? Understanding the Relationship between Alcohol and Mental Health. London, MHF.

[44] M. Kreek, D. Nielsen, E. Butelman and S. LaForge. Genetic Influences on Impulsivity, Risk Taking, Stress Responsivity and Vulnerability to Drug Abuse and Addiction. Nature Neuroscience 2005; 8: 1450-1457.

[45] D. Healy. Shaping the Intimate: Influences on the Experience of Everyday Nerves. Social Studies of Science 2004; 34: 219-245.

[46] S. Morse. The New Neuroscience and Responsibility: Radical Challenge or Business as Usual? Paper presented at Law, Mind and Brain: Interdisciplinary Colloquium, London, February 2006.

[47] T. Buller. What Can Neuroscience Contribute to Ethics? Journal of Medical Ethics 2006; 32: 63-64.

[48] For reviews of a therapeutic orientation within the criminal justice system to those suffering from addiction in the United States and the United Kingdom, see, inter alia, T. Carns. Therapeutic Justice in Alaska's Courts. *Alaska L Rev* 2002; 52: 1-43 and National Audit Office. 2004. The Drugs Testing and Treatment Order: Early Lessons: a Report by the Comptroller and Auditor-General. London, National Audit Office.

[49] See, inter alia, R. Ashcroft et al. Ethical Aspects of Developments in Neuroscience and Drug Addiction. Foresight Brain Science, Addiction and Drugs Project http://www.foresight.gov.uk/Brain_Science_Addiction_and_Drugs/index.html . R. Ashcroft and C. Franey. Further Ethical and Social Issues in Using a Cocaine Vaccine. Journal of Medical Ethics 2004; 30: 341-343.

[50] M. Hoffman. Therapeutic Jurisprudence, Neo-rehabilitationism and Judicial Collectivism. *Fordham Urbana Law Journal* 2002; 29: 2063-89.

[51] M. Valverde. 1998. Diseases of the Will: Alcohol and the Dilemmas of Freedom. Cambridge, Cambridge University Press.

[52] O'Malley and Valverde, op. cit. note 27.

[53] For a definition and discussion of the neuroscience of salutogenesis, see D. Smith. Functional Salutogenic Mechanisms of the Brain. Perspectives in Biology and Medicine 2002; 45: 319-328 and B. Lindstrom and M. Eriksson. Salutogenesis. Journal of Epidemiology and Community Health 2005; 59: 440-442.

[54] R. Depue and J. Morrone-Strupinsky. A Neurobehavioral Model of Affiliative Bonding: Implications for Conceptualising a Human Trait of Affiliation. Behavioral and Brain Sciences 2005; 28: 313-385.

[55] See http://www.dailymail.co.uk/pages/live/femail/article.html?in_article_id=34774&in_page_id=1879

[56] See http://www.dailymail.co.uk/pages/live/articles/health/dietfitness.html?in_article_id=3008&in_page_id=1798

[57] See http://www.dailymail.co.uk/pages/live/articles/health/dietfitness.html?in_article_id=3008&in_page_id=1798

[58] See http://www.ruthinking.co.uk/ for advice on sex passed on via the National Health Service.

[59] N. Rose. 1999. Governing the Soul: the Shaping of the Private Self. London, Free Press.

[60] N. Rose. 2004. Becoming Neurochemical Selves. In Biotechnology, Commerce and Civil Society. N. Stehr, ed. New York: Transaction Press: 1-48.

[61] P. O'Malley. 1996. Consuming Risks: Harm Minimisation and the Government of 'Drug Users'. In R. Smandych, ed. Foucault and political reason: liberalism, neo-liberalism and rationalities of government. London, UCL Press.

[62] M. Foucault. 1985. The History of Sexuality: Volume Two: the Use of Pleasure. London, Penguin.

[63] C. Duff. Drug Use as a 'Practice of Self': Is There Any Place for an 'Ethics of Moderation' in Contemporary Drug Policy? Int J Drug Policy (2004) 15: 385-393.

[64] Reith, op. cit. note 1.

Genomics, Society and Policy, Vol.2 No.1 (2006) ISSN: 1746-5354

[65] Ibid at 297.
[66] Ibid at 297-298.
[67] O'Malley and Valverde, op.cit. note 27.
[68] N. Fox. 1999. Postmodern Reflections on 'Risk', 'Hazard' and 'Life Choices'. In D. Lupton, ed. Risk and sociocultural theory Cambridge, Cambridge University Press.
[69] O'Malley and Valverde, op. cit. note 27 at 39.
[70] Healy, op. cit. note 45.
[71] N. Rose and C. Novas. 2003. Biological Citizenship. In A. Ong and S. Collier, eds. Global Anthropology London, Blackwells. 1-45.
[72] H. Biggs and R. Mackenzie. 2000. Viagra is coming! The rhetoric of choice and need. In M. Freeman and A. Lewis, eds. Law and Medicine: Current Legal Problems. Oxford, Oxford University Press. 341-361.
[73] Layard, op. cit. note 13, p. 192.
[74] Layard, op. cit. note 13, p. 20.

Genomics, Society and Policy, Vol.2 No.1 (2006) ISSN: 1746-5354