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Abstract
In this article I discuss two premises, firstly, that drug addiction is characterised by impaired control over drug taking and secondly, that free will is the capacity for choice. I shall then discuss the subsequent implication of these two premises, that the existence of the disease of drug addiction is empirical evidence for free will. Finally, I consider how this view may fit with other neuroscientific findings of free will and the moral implications of this argument. Whilst the relationship between drug addiction and free will has previously been discussed in various ways, this essay is specifically concerned with highlighting areas of overlap between philosophical and ethical considerations of compatibilism and the science of addiction.

Keywords
Free Will, Drug Addiction, Compatibilism

Drug Addiction as Loss of Control

Modern diagnostic criteria for addiction see continued use despite negative consequences and impaired control over drug taking as the fundamental elements of addiction (American Psychiatric Association 2013). The characterisation of addiction in psychiatry by compulsive or uncontrolled drug seeking was not, however, conceded lightly. The earliest characterisations viewed drug addiction as a social problem and the condition was designated as a personality disorder (see Saunders 2006). Later, biological elements of addiction were acknowledged but addiction was described by the presence of physical withdrawal syndromes which lead to dependent users re-taking drugs in order to negate their symptoms. Whilst such a view was desirable in that it preserved voluntary behaviour it failed to effectively characterize drug addiction, particularly in accounting for drugs which are highly addictive without producing withdrawal symptoms (see Hyman 2007).

In 1987 with the revision of the DSM III, psychiatry conceded the vulnerability of our capacity for self-control and that characterising addiction as uncontrolled drug-seeking behaviour was necessary for accurate diagnosis of this disease. This view has remained though the term 'dependence' was used for addiction until the publication of the DSM V, owing to concerns over the possibly pejorative nature of this term (O'Brien 2011). David Nutt gives the psychiatric stance on addiction bluntly: *"Anyone who's met an addict*

knows that most addicts don't want to take drugs, but they're compelled to by something that is beyond them" (Boyce 2013). In asserting this finding the science of addiction became one with moral implications and the critique of science in this area can act as a proxy for debates of moral responsibility. An important argument against this scientific view of addiction is that it endorses the submission of addicts towards drug taking and may therefore dissuade them from confronting their disease. However, whilst this view asserts that control over drug-taking can be impaired, it also acknowledges that control can be recovered, through detoxification, treatment and external prostheses (Hyman 2007).

Free Will as the Capacity for Choice

Above the quantum level at least, all physical effects are adequately determined i.e. they are caused, not random, and all events thereby form part of an unbreakable and inevitable causal chain. The view of compatibilism is often most associated with the enlightenment thinker David Hume and its modern day champion Daniel Dennett. Compatibilism is the view that free will is compatible with this determinism and sees the 'causal chain' as constituting our freely made deliberations and decisions. The main objection to the compatibilist view is that if our behaviour is determined then it can only ever occur in one way and in this sense we are not 'free' to act otherwise. The difference here is in thinking that as the decision was caused it was in some way compelled, but the compatibilist view asserts that the scientific laws of free will are descriptive of, not prescriptive to, our free will (Berofsky 2002).

In the compatibilist view then the will is free in that we are able to make wilful decisions over how to act, it is the capacity for choice. In this way it has often been argued that compatibilism functions by defining a bland variety of free will and such a criticism was perhaps most notably stated by Kant (1909). However, the compatibilists typically counter such criticism by stating that it is the defining of free will as something which could exist only as a metaphysical construct that leads to confusion or the "pseudo-problem" of free will, as Moritz Schlick described it (Schlick 1962).

The other major affirmative position of free will is libertarianism which asserts indeterminism, often as part of a mind-body dualism, as a requirement for free will. The major philosophical objection to this view is that if our decisions are influenced by randomness, then in what sense can we lay claim to them and in what sense are they truly decisions? Indeterminism also presents the scientific problem of reconciling indeterminacy with the function of the brain. This problem was notably confronted by

the neurophysiologist John Eccles, though more recently the biologist Martin Heisenberg has looked to single cell life in an examination of this issue (Heisenberg 2009).

Heisenberg like some other libertarians such as Bob Kane, argues for a combination of indetermined and determined elements in free will thereby theoretically achieving both freedom from the causal chain and wilfully determined actions. The philosopher Alfred Mele has indicated that we can remain 'agnostic' on the exact details of free will as both compatibilism and libertarianism argue for free will as autonomism and thus we can accept autonomism without final knowledge of which view is true. However, in synthesising a form of libertarianism to reach his standard of autonomism Mele again indicates the necessity of a compatibilist decision making stage (Mele 1995). Such ideas emphasise the compatibilist thesis of free will being the capacity to choose our actions i.e. for control, and this necessitates causality (Mele 1995). However, whether we assert compatibilism in its entirety or remain agnostic on whether indeterminism may influence our thoughts prior to our decision is not crucial here. A simple expression of this notion of free will can be found in Hobart (1934): *"Two courses of action present themselves to my mind. I think of their consequences, I look on this picture and on that, one of them commends itself more than the other, and I will an act that brings it about."*

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Whilst completely dependent on its premises, the argument presented here can now be stated: If we have the capacity to become impaired in our ability for choice over whether or not to take a rewarding drug, then clearly in the first place we do have the ability to make such a choice and so we do have free will. When we become addicted we lose (at least to an extent) the ability to wilfully decide for or against taking the drug in the normal way – as described by Hobart. In the compatibilist view we lose free will, with respect to taking the drug at least, and evidence for the capacity to lose a quality betrays its existence. This is the central contention of this essay, that evidence for drug addiction as being the loss of control over drug taking is empirical evidence for the existence of free will.

Profound insights into free-will were produced by the experiments of Benjamin Libet which demonstrated that, for some actions at least, brain activity precedes conscious perception of the decision to act (Libet et al. 1979). Some have taken such experiments to indicate that consciousness is purely along for the ride and we are self-deceived by an illusion of conscious control (Wegner 2003). Such epiphenomenalist conclusions leave us in a somewhat confusing position, not least because of the difficulty in seeing why such

a system would evolve (Popper and Eccles 1977). Michael Gazzaniga suggests that such ideas are flawed due to crude thinking on (or the language of) causality and advocates a view of consciousness as an emergent layer of organisation with its own timescale. In this view our consciousness may both cause and be constituted by brain activity analogous to the way that a computer program causes and is constituted by the microscopic physics of hardware (see Gazzaniga 2011).

The loss of control in addiction is thought to be due to a dysfunction in top-down signalling from the prefrontal cortex which results in a reduced inhibition over drug-responses (Jentsch and Taylor 1999). Brain imaging studies have observed that addicts have decreased activity in several prefrontal regions (Volkow et al 2012) and patients with prefrontal cortex damage exhibit similar deficits in decision making (Becara 2005). This is consistent with the long-standing view of the prefrontal cortex as being the central area for our cognitive control. This encompasses a range of 'executive' functions including working memory, retrieval and selection of information, value representation and inhibitory control which ultimately allow us to orchestrate our thoughts and make decisions (Miller and Cohen 2001, Funahashi and Andreau 2013). Whichever view is taken on the implications of the findings of Libet, the compatibilist thesis of free will is affected only in the nature of how consciousness is involved. However, the argument presented here indicates that free will can be characterised by that which is impaired in the addictive state, and this is our cognitive control.

Moral Relevance

As the basic argument by Galen Strawson (1994) illustrates, compatibilism does not see that we are 'ultimately' responsible for the factors determining our decisions, our *"motives, inclinations and circumstances"* as Hume (1777) described them, and this may alter our perspective on the idea of retributive justice. However, what is central to utilitarian justice is that we are able to choose whether or not to act according to the mutual laws of our society – it is our free will. Therefore our capacity to lose control is crucially important in that it affirms our moral competence, as noted by Daniel Dennett: *"We are rightly concerned to maintain our integrity as choosers so that we can be responsible for the actions our bodies engage in"* (Dennett 2012). Further to this however, there is psychological evidence that the very belief in free will itself can affect moral attitudes (Vohs and Schooler 2008), highlighting the importance of extended consideration on these issues.

The argument presented here also has strong implications for animal ethics and ideas of human exceptionalism. The raw compatibilist view asserts that all animals have free will and many animals appear to have the capacity for addiction, supporting this idea. However, no other animal, and particularly non-primates, have a well-developed pre-frontal cortex. Also, as discussed, compatibilist free will is closely tied to moral responsibility but the idea of holding animals to be morally accountable for their behaviour would appear quite absurd. Within compatibilism, many philosophers have confronted such problems and have described different types or elements of free will and future examination of these may be useful. For example, Mortimer Adler described an 'acquired freedom of self-perfection' as the ability to make decisions based on reasons over a slavery to passions (Adler 1958). It is interesting to consider whether such an idea may serve as a more accurate description of free will as implied by the human capacity for addiction and to what extent such a term may be synonymous with neuroscientific formulations such as cognitive control.

Conclusion

In the compatibilist view we are freely able to choose our actions in a determined universe. Science indicates that drug addiction is inescapably characterised by a loss of control and this reciprocally supports this compatibilist notion of free will. Whilst the experiments of Libet have raised questions over the role of our consciousness, this argument indicates that our free will may be better identified with prefrontal executive functions. As evidence for compatibilist free will, the existence of drug addiction affirms the moral competence of human beings though raises questions for animal ethics.

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