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The naked empress. Modern neuro science and the concept of addiction

Peter Cohen

‘Relativement a toute autre forme don’t il s’écarte ce vivant est normal, même s’il est relativement rare’

Georges Canguilhem (19) [[a](#)]

Introduction [[b](#)]

In this essay I will discuss some of the most recent expressions in neuro scientific medicalization of ‘addiction’, but my dissatisfaction with the concept of addiction and its treatment is older than these developments. I will put forward that if the addiction concept is lacking in scientific rigor and clarity, any medical approach to addiction will suffer from the same. My main practical problem with current medical involvement with addiction is that people who are diagnosed as addicted are made more powerless to manage their life than other clients of medical treatment. Addiction medicine will often take over and decide about what intervention to make, stemming from a vision on addiction that makes the concerned person incapable of self management.

Medical practice in the field of addiction mirrors cultural notions about addiction and empowers an oppressive regulatory kind of involvement. Modern neurological theories about addiction tend to maintain or strengthen this oppression by transforming addiction into a ‘brain disease’ and therefore a serious mental disorder.

This essay will probe into the underlying material for the claim that addiction is a ‘brain disease’ and suggest a different theoretical approach to ‘addiction’.

Two short introductory examples to illustrate oppression in the field of addiction:

- ∨ Interviewing an addiction doctor, after he worked a few years in the city of Amsterdam, he complained that criteria for opiate maintenance in the city are far too restrictive. Citizens of Amsterdam regularly using opiates for more than 30 years are still denied access to legal (smokable and or injectable) opiates. They are allowed to receive methadone, but are denied the substance they prefer. This doctor observes that the concerned people are ‘fully capable’ of managing their drug use, they should be liberated from the black market and exist inside a legal system of access to substances of their choice.
- ∨ Interviewing a long time drug user and member of the ‘Amsterdam Junky Union’, with more than 25 years of experience, she told me that her communication with the medical system was kept at a minimum. Even when ill she evades communication with the system because they ‘take over’ and interfere with her drug taking life style. She refuses access to methadone or legal heroin. This woman provides for herself by buying and selling illicit drugs and remains out of prison most of the time. She almost lost an infected ear because she fears the medical system so intensely she stayed away too long [[1](#)]. This example is not to say that strong evasion is typical for intense drug users in the city of Amsterdam. It is just an

illustration of one of the theses in this essay, that 'addiction' when diagnosed renders people incompetent, far more so than necessary or acceptable.

An explicit proviso has to be made for a type of drug using client, well known in the city of Amsterdam and elsewhere, who is homeless, diseased and underfed with very serious problems of survival. For such clients of the drug treatment system one could speak of misplacement because their main problem is not 'addiction'.

Three axes

My criticism of the work of neurologists or neuro pharmacologists in the field of addiction is organized along three axes.

- ∨ The first and basic axis is criticism of the concept of addiction itself. I will propose an alternative way of looking at behavior that is currently called addiction, seeing it as normal human potential, that of *strong bonding*. Bonding is an emotional process that creates ties that cannot be shed at will. Human bonding can take place with a large variety of objects, from food, drugs, ideas, people, places to musical instruments and animals. The stronger a bond the more an individual will value and defend it, even under conditions of (extremely) negative consequences. Bonds, also strong ones, should as a rule be respected and not made illegitimate. Bonding is a general and inescapable human propensity but the designation of some *intensities* (of feeling, of involvement) or some *objects* as deviant or 'addiction' is specific to a culture. I will use the concept of 'phobia' as a comparison, phobia being the negative counterpart of bonding, but nonetheless as inescapable and hard to free oneself from. Most bondings (*liaisons*) and phobias can be accepted and integrated into life, unless the individual (or society or both) decide they have become unbearable. Acceptance is a cultural and political process that can be increased or decreased. Medicalization and criminalization of an 'addiction' is a way of lowering the level of social acceptance of certain bonds, just like medicalization and criminalization of homosexuality.
- ∨ The second axis, related to the first but apart from it, is based in a more epistemological approach, analyzing the way conventional notions about addiction are translated into the jargon of neurology or the language of development in neurological knowledge. My thesis is that the human behavior summarized as 'addiction' is not studied by neurologists, that the cultural notions of addiction are taken as wholly self evident and then 'confirmed' in neurological description of the same. The notions of addiction transformed into the language of neurology as performed by authors like Volkov, Berridge, Gessa or De Vries are completely tautological.
- ∨ The third axis criticises some of the methods that underlie this tautological activity. I will show that evidence for the construction of understanding neurological process behind 'addiction' is nonexistent. Instead, all neurological process that is seen, recognized or 'discovered' is just as scientific as the work of Cesare Lombroso (1835-1909). Lombroso and people like him present a model of how historical notions of a concept (like crime, addiction, homosexuality) are projected onto quasi scientific biological characteristics and their measurement, 'craniometry' in Lombroso's case. They create an illusion of empirical rigor, e.g. by presenting images and scans of brains, coloring them in a certain way, and decide that these (arbitrary) colorings represent 'evidence' of the pre-existing notions. No third party validation takes place at all, and the evidence is no more than some interpretation in the mind of the creators of these images. So, the empress appears to be naked. Also, people entering the addiction treatment system are never diagnosed via a scanner or any technique of neuro-imaging because it is simply impossible to diagnose 'addiction' that way. Neurology's place in the field of addiction is purely *post hoc*. Neuro imaging offers a form of hocus pocus not geared towards better diagnosis but towards suggesting a scientific and medical foundation of the addiction concept.

Examples of neuro scientific confirmations of addiction

Addiction is a behavior that is associated with particular patterns of consumption (of food, drugs) or involvement (with betting, sexual activity, internet communication).

Frequency and intensity that are maintained in spite of negative consequences of the behavior are the essential characteristics of the 'pathology'. The criteria of intensity and tenacity that make the behavior pathological are mentioned in DSM IV. DSM IV recognizes 7 criteria of dependence, of which only 3 have to be met within a 12 month period. For abuse to exist, DSM IV defines 4 criteria of which one has to be met within a 12 month period. These criteria all refer to behavioral characteristics or ways of life [2].

A fundamental trait of this type of definition is that evaluation of the applicability of a criterion is not made by means of a laboratory test (as with viral diseases) or solid observation of a condition (as diagnosing a broken bone with an X ray photograph). Applicability is established by experts working in the field, on the basis of stories about a person's life or external characteristics of a person. This way of diagnosing is extremely subject to a range of cultural and ideological preoccupations that will change over time or even disappear all together [3].

Someone using opiates daily, for years, outside the parameters of a medical treatment will be diagnosed as a dependency 'patient'. But someone using drugs daily to manage cholesterol or glucose levels is not. The difference is located in the type of motivation for drug taking. Regular non medical use of opiates is seen as compulsive and not related to valid motivations, while use of the other drugs is seen as having a 'legitimate' reason. Also, someone returning to the horse track all the time, borrowing money to bet, and unfulfilling of motherly tasks, is diagnosed as addicted to betting. Someone who is deeply in love with horses and dedicates her life to this 'magnificent' animal is not addicted to the saddle [4]. Or someone leaving wife and kids for a military career, going back to difficult and even lethal danger as a soldier, is not diagnosed as addicted to danger or killing. And someone who has chosen to play a musical instrument, day after day to such a degree that no time is left for other 'normal' activities is not diagnosed as addicted to the violin but defined as an artist. And to end this series of examples, someone insisting to remain true to an idea of liberty, as member in a resistance movement, like during the German occupation in WW2 in the Netherlands, hiding allied pilots or weapons, is not seen as addicted to an idea of liberty in spite of the real danger to be executed or incarcerated. Types of motivation are the difference. Some motivations are considered to be voluntary, while others allegedly are not.

Still, the examples mentioned here all imply choices to continue something in spite of negative consequences. The described choices are maintained by a strong bond to the activities. All have negative consequences, but some are seen as deviant, others are seen as 'normal'. The bond of someone addicted to the 'addictive activity' is pathology per definition because the bond cannot be given up at will. But can the other bonds?

In the eyes of Kalivas and Volkov "The neural basis of Addiction; a pathology of motivation and choice" (*Am J Psychiatry* 2005; 162:1403-1413) 'the compromised ability of addicts to suppress drug seeking in response to that desire even when confronted with seriously adverse consequences, such as incarceration' is a central characteristic of what they see as motivational pathology. The urge is uncontrollable: "once a person is addicted the uncontrollable urge to obtain drugs and relapse arises from a pathological form of the plasticity in excitatory transmission" (page 1403) because of some form of, as they say, neural dysfunction. Such dysfunction however is not diagnosed if a person cannot live without her partner, violin or cat and mourns once these bondings are severed. [5] And I do not even question the truthfulness of the remark that the 'urge is uncontrollable' all the time. Addicts I have interviewed will often tune their substance taking to circumstance, context and availability and have a large window for control of dose and frequency. 'Uncontrollability' is a central construction inside the concept of addiction, although it to a degree is a characteristic of most bonds and certainly of strong ones. 'Uncontrollability' may also summarize subjective feelings of incompetence to steer one's life into other lanes when people are forced into

abstinence ('lived experience' as Reinerman says [6].) [7].

"Addicts' extreme difficulty in resisting the desire to use drugs of abuse is encoded by changes in excitatory synapses" (Kalivas and Volkov, idem) but the extreme difficulty to not hide allied pilots and succumb to foreign dominance is not? Kalivas and Volkov define 'end stage addiction' as "an overwhelming desire to obtain the drug, a diminished ability to control drug seeking, and reduced pleasure from biological rewards." But such a description could just as well apply to a prisoner, in love and yearning to be with the lover she misses, sacrificing other activities and 'biological rewards'. If overwhelming desire to be or continue to be with the object of desire is to be seen as 'end stage addiction' most healthy people are end stage addicted at some point of their lives or all the time.

Kalivas and Volkov maintain also that "the cardinal behavioral feature of drug addiction is continued vulnerability to relapse after years of drug abstinence" (idem 1410). But my ability to ride a bike after years of riding a car is not relapse? Could not we imagine the 'vulnerability to relapse' as a response to conditions in which earlier learned behavior had shown functional relevance? Picking up smoking again in conditions of anxiety and fear may be nothing else but application of earlier lessons in successful adjustment to stress. Describing such learning as neural adaptation does not change it. Similarly, I would not be able to relapse into riding a bike when I find a bike, *if I had not learned to ride a bike before*. The term relapse as used by addiction experts simply refers to a general ability of humans that is to apply learned behavior under certain conditions, even a long time after the initial learning has taken place. If the behavior is not stigmatized it is not seen as 'relapse', but it is once stigmatized.

It is clear that Kalivas and Volkov have established views on what addiction is (uncontrollable urges, relapse, pursuing drug use in spite of negative consequences). These views are not the *result* of their research in the field of neurology, they precede it. Reading neurological data is not intended to question conventional ideas about 'addiction, it is focussed on their confirmation. Later we will try to establish if such confirmations have merit.

Let us continue this excursion into neuro- addiction country with another author, Gian Luigi Gessa, a professor of pharmacology in Cagliari, Italy. We see here the same mechanism of reading pre-established views on behavior into neurological data. "The drug imposes to the one who is dependent to continue injecting, sniffing or smoking till the last milligram. Or till physical exhaustion, overdose or death" [8]

But a man continuing to climb Mont Blanc or Mount Everest, holiday after holiday even under bad and exhausting weather conditions, not listening to the crying wife, and one day paying with amputations or dying in the process, is not described as a relapsing addict. For mountaineers the dedication to the activity is constructed in different ways. Gessa says the neuro biologist 'maintains that the biography of the addict represents a biochemical and functional change in specific neural systems, produced by continued use of the drug that forces him to drug himself'. (idem page 59) Gessa speaks of 'force' and embeds himself into the mainly cultural language of addiction, where the will of the person has over time succumbed to changes in 'neural systems'. The problem of course is that probably all learning produces temporary or lasting 'change in neural systems'. Also, continuation of learned behavior may be functional in the eyes and experience of the person but less so in the eyes of the outsider. Who is right? We know of people remaining married in spite of-in the eyes of a beholder- a very bad marriage. Who speaks of lasting 'neural change' as the basis of the continued marriage? But, even when a person herself sees some behavior as counter functional, it is not necessarily seen as addiction. It may be seen as impotence, ingrained habit or unhappy adaptation. It all depends on which behavior we discuss, not on the brain.

Gessa performs a lengthy review of several new technical possibilities of observing the brain in action, like brain imaging (PET, SPECT and fMRI). And he offers assumptions about behavior based on these fledgling techniques: "repeated consumption of cocaine produces, in the area of stimulation of dopaminergic neurons lasting functional modifications that *are considered to be the*

neurobiological substrates on which the symptomatology of addiction is based.” (idem page 109) We see once more how the model of addictive behavior is transformed into language of neuro pharmacology, by people who never were experts of (parts of) human behavior to begin with.

Taco de Vries, a Dutch behavioral neuro scientist, says in similar language that “these experienced effects of drugs are, as it were, chiseled into our brain and change communication between brain cells permanently. One of the affected brain areas is the prefrontal cortex that is *implicated* in decision making about and planning of our behavior. Decay of this area causes a permanent loss of control over behavior” [9]

‘Decay’ of the prefrontal cortex is a serious condition that can be studied in people with certain brain tumors or brain wounds. But does prolonged drug consumption cause ‘decay’ of the prefrontal cortex? No neurologist has ever been able to look at a brain scan and diagnose a decayed frontal cortex because of drug use.

And what exactly does control over behavior mean? Do we control our behavior when we hit our finger with a hammer and curse? Is our prefrontal cortex in control of our behavior when we choose to live in the country where we are born [10]? Or remain faithful to the religion in which we were reared? Do we control our behavior when we give in to ambition and decide to take a short breakfast and leave for work? During which great moments of our hyper-ritualized lives do we control our behavior and how do we recognize such control? Unless we come up with a rigorous and unequivocal definition of ‘control’ a scientist like De Vries cannot establish from neurological expertise that people who experienced frequent drug effects are so called addicts showing ‘permanent’ loss of control.

I asked him to consider this, proposing other explanations for the ‘addict’ behavior [11]. It is possible to understand even the most deviant addict behavior not implying the concept of control but he emailed:

“I repeatedly speak with addiction doctors and other addiction experts; they do not confirm your view.” [12]

One of the problems of addiction is that those who are supposed to investigate it, seem to know all about it, sometimes by hearsay. Is being addicted really something else as not wanting to change behavior? Resisting change in spite of negative consequences is such a basic element of everyday life, that when googling “resistance to change” 532.000 results appear, from scientific to popular literature. ‘Resistance to change’ is not often read as loss of control, but in the case of addiction it is. The key is in words like ‘uncontrollable’ and ‘compulsive’ but as said, we may have a very selective eye for where we assume the existence of control, and where not.

To end this discussion of neurological approaches to ‘addiction’ I will remain shortly with the work of two psychologists who were important for neuro constructions in the field of addiction, next to people like Michael Bozarth or Roy Wise. I speak about Terry Robinson and Kent Berridge who published a 45 page long article on the neural basis of drug craving enriched with a review of addiction theories in 1993 [13]. This article was followed by expanded attempts to work with the concept of incentive salience and its neural basis in a 60 page review in 1998, and a 27 page review in 2000 [14]. Robinson and Berridge do not use techniques like PET and fMRI but they were key actors in expanding the language of neurological process to the debate on what addiction is. This language is used in the later applications of scanning techniques, expressing what is found or should be found.

The broad hypothesis of Robinson and Berridge (1993) is that the brain will be affected by drug consumption in such a way that the neural system responsible for ‘wanting’ drugs could become hyper sensitized and thus produce critically increased ‘salience’ of drug related stimuli. Salience is increased to such a degree that addiction follows, a behavior that even addicts themselves do not understand. They work with a view on addiction that postulates the existence of a condition that

nullifies normal 'disincentives'. In fact, they try to provide a set of neurology based hypotheses that makes it comprehensible why people who are 'addicted' continue behavior most people see as counterproductive or destructive and insensitive to what we (normal) people would expect to make us stop.

Essential for their view on some addictions is that they are 'obsessive' defined as compulsive, 'stereotyped, repetitive behavior' (1993, 276) devoid of rational motivation. "'Wanting' evolves into obsessive craving and this is manifest behaviorally as compulsive drug seeking and drug taking. Therefore, by this view, drug craving and addictive behavior are due specifically to sensitization of incentive salience." (1993, 249)

These authors will throughout their article return to views of drug addicted behavior in which rational, comprehensible and constructive motivation for continued drug use is simply nonexistent. They throw in a large number of references (mostly) about animal experiments in which particular brain areas are studied. For their notion of 'craving', animal experimentation is impossible so also there they *postulate* the irrationality of addict behavior. "Craving is obsessive, irrational, pathologically intense drug 'wanting' for no obvious reason, which leads to compulsive drug-seeking and drug-taking behavior." (1993,272) Longing desperately for someone you miss, for freedom, or a holiday, and the neuro adaptations (sensitizations) they cause are not discussed by Berridge and Robinson which is a pity. Unless such cravings are understood there is no reasonable ground to suspect they are any different than craving a drug, except in their legal consequences. "An Incentive-Sensitization view of addiction suggests that to really 'cure' addiction agents need to be developed that directly target and reverse the neuro adaptations underlying sensitization." (1993, 271) In the search for proof of these neuro adaptations fMRI and PET techniques were to play an increasing role.

In spite of the fact that Berridge and Robinson are exceptionally -and bravely- clear about the hypothetical nature of their explanations and the possible neural bases of 'addiction', they do not confront the limitations of not studying 'addict' behavior itself. This means that the work they do to find plausible explanations takes place within mainly conventional passed down versions of what addictive behavior is and addiction theories. They seem not to be open for a view in which addiction is a normal state of affairs (strong bonding that cannot be entered or exited at a whiff even when some consequences are negative). However, in the 2000 version of their theoretical work they seriously complicate their view and add a range of important qualifications to their hypotheses. Probably the most far reaching of those is their view that sensitization is context specific.

Sensitization "is not a simple pharmacological phenomenon, but both the expression and the induction of sensitization can be powerfully modulated by non-pharmacological factors, including environmental (and presumably psychological) factors associated with drug administration." [15] The difference between any sensitization that takes place in humans (as an effect of learning) and drug related sensitization may be much less than they earlier expected. Scientists like Berridge and Robinson who go far in proposing series of alternative hypotheses within sensitization based views on 'addiction' behavior may be the kind who will also introduce different views on addiction itself. In their last review article (2000) they show extensively why pharmacological approaches to addiction treatment are improbable to bring success. If following and testing neurological translations of addiction language go far enough as to find they lead nowhere, we could even imagine that such neurology enables the demise of conventional addiction theory!

Finding explanations that already exist, employing neurology

In this part of my criticism of neurological explanations of addiction I will highlight the ways in which these explanations are produced using a few modern authors on the topic.

Melissa Littlefield (2009) discusses fMRI and PET techniques used to produce tests of 'truth' when done on arrestees involved in criminal cases. Her study of practice related theories of the brain do

not have ‘addiction’ as a point of departure but ‘deception’. Her detailed probing into the methods applied to reach conclusions about how fMRI informs on the behavior of the arrestee is clarifying and useful for an approach to theories of the brain that allow space for reflexion on the relation between such theories and their application. “Far from describing the brain and its functions, fMRI and Brain Fingerprinting produce models of the brain that reinforce social notions of deception, truth, and deviance. [16] (p 1).

And, says she: “In addition, given the biological turn of the cognitive sciences, brain-based detection proponents use arguments about nature to buttress and justify cultural norms. Far from describing the brain and its functions, the protocols of and assumptions about fMRI and Brain Fingerprinting produce and are the products of brain models that reintroduce and reinforce connections between biology, deviance, and deception.”(p 20)

In my own words, scientists working with techniques measuring brain activity will apply theories about the functionality or the process of the brain that depend on their point of view. The brain is so complicated and its elements so immensely interrelated in poly layered ways that the scientists working with the brain are helpless UNLESS they make assumptions about the brain’s structure, and hypotheses about the relation between elements of the brain and perceived functionality. The next step is to make hypotheses about such functionality and *behaviour*, another ball game altogether. So, once brain imaging techniques are used to come to certain conclusions about human behavior and not purely about the complexity of the brain per se, culturally based models will structure the way we create connections between brain activity and behavior. If I think that powerful emotional bonds result from identification, as is common in psychoanalysis, I might look for the process of ‘identification’ in the brain i.e. neural process that represents identification.

“Brains are not natural objects that exist outside of their cultural—and scientific—construction” (p 13) says Middlefield. This is, according to me, *quite inevitable*. So, behavioral neurologists should study behavior in the first place. Once their hypotheses about behavior have acquired some standard of evidence, it becomes useful to look for the interaction between *human behavior in a series of social contexts* and the adaptive brain. Behavioral neuroscience cannot be of a higher relevance than both the conceptual models of behavior they are based on and the rigor with which such models are tested [17]. In her discussion about the neural basis of ‘deception’ Littlefield notes that:

“In evolutionary psychology, for example, the brain is characterized as a piece of hardware, whose primary function is to solve adaptation dilemmas for the sake of survival. According to this rubric, deception may very well be a positive, adaptive trait, not simply a physiologically wasteful activity” (p 15). The same could be said of 'addiction' i.e. that it is a form of adaptation that supports a human being in some way. Instead of being perceived as pathological or abnormal, any addiction could be seen as justified as long as it serves successful psychological or existential adaptation [18]. Outside evaluation of what ‘successful’ means is subject to social and ideological distortion and should not be applied by scientists, unless with the highest forms of caution. As Canguilhem observes:

“An anomaly or a mutation is not in itself pathological. They express other *norms* of life that are possible”. [19] It could be reasoned that addictions are far from an ‘anomaly’ because the notion of addiction might describe a large number of bonds that are not seen as pathology. But even if addiction were an anomaly in the sense of ‘rare’ we could evolve into seeing it simply as ‘an other norm of life’.

For this discussion it is useful to realize that in some fields of application, techniques of magnetic resonance can produce images that have to be compared to what is known to produce intelligible information. Prasad’s detailed description of how radiologists look at MRI scans not only shows that training is important, but also the presence of known atlases of human physiology. Computer assisted medical visualization “continues to depend on other visualization technologies and diagnostic inputs in fixing biological reality and detecting pathology.” [20] This means that if general medicine is the field in which MRI techniques are applied, a vast preexisting knowledge of human anatomy and of patho physiology is already part of ‘the medical gaze’. Preexisting

knowledge makes it possible to know where we *expand* our knowledge. But if MRI is applied in a field where anatomy is developing, together with hypotheses about behavior, synaptic activity and neural interactions, room for interpretation is vast and as we have seen, less restricted by methods of filtering out error. Scanning techniques will continue to be developed in brain science, of course . But application presupposes an intensified kind of care to prevent *post hoc* constructing, foremost if application is tied to (possibly immature) conclusions about what makes people 'ill' or not.

As a last illustration of the role of conventional models in neurology I will quote a complex but revealing conclusion from Christian Huber's detailed review about neuro-imaging:

"Taking the methodology of fMRI as an example, we have shown that the 'neuroimage', a color-coded statistical map superimposed upon an anatomical brain scan, is an indirect measure of the object of interest, and that the naive assumption of directness and objectiveness must be rejected." [21] Huber is of the opinion, as I am, that neuro imaging has to be 'in a dialogue' with psychology and philosophy, and that the inclusion of those sciences in neurology cannot be independent of theories in those fields. Most neurologists could agree with this, but they almost always lack in clarity about when such dialogue is implicit in their work, or even absent where it should be present. In the examples I gave of neurological explanation of 'addiction' our common sense cultural theory about addiction is imported as a matter of fact, and not as an explicit import that needs defending.

Discussion

In the field of addiction I know of no neuroscientist who is interested in 'addicts'. They are interested in the brain and in as far as they study brains or brain tissue they study mice and rats. The labor rats are willing to do to procure drugs under different circumstances is taken as valid information about 'addiction' and human brains.

The enormous distance from human subjects of neurologists studying 'addict' behavior , and their even larger distance from expertise on open, scientific endeavors to study human bonding, makes the ability of neurological techniques to innovate our knowledge of human attachment behavior highly questionable. It surely is irresponsible to claim that 'addiction' is a brain disease based on the present state of neurological knowledge and underlying theories and techniques. It is more probable that addiction is a normal human bonding to an object, in spite of the negative social and cultural evaluations it is subjected to.

We seem to be in the midst of a science (neurology) that when applied to 'addiction' is a centre piece of *an ideology of modern human autonomy*. Empirical or philosophical assumptions about the existence of a 'true' autonomy of men are fundamental to our theoretical construction of 'addiction'. But we do not treat those visions as the unseen fundamentals of our behavioral points of departure. Neurologists work with them just as anybody in the streets of modernity and their common societal certainties about 'addiction' deserve scrutiny.

Their assumptions are dogmatic and of theological nature, just as earlier the Christian assumption of 'original sin' that prevented man to be good and made him need a priest to help save his soul. So, constructing a modern cosmology of 'autonomous' decision making supported by neurology is more like a religious activity than a scientific one. It makes men need the addiction doctor for help in being autonomous. In that it merely mirrors the construction of a cosmology of Earth and Sun in the days of Galileo, based on biblical astronomy. [22] But if the bible is wrong on astronomy, papal astronomers are in trouble. If the postulate of modern human autonomy is wrong, addiction doctors are in trouble.

My proposal would be we view addictions as being no different than any other human bonding to objects or behaviors, and stop creating a category of deviant bondings and pathologize those. Instead we could change our interaction with these bondings now called addiction and treat them as we treat 'normal' bondings ,fears or phobias: we leave them alone *unless* the person herself wants

interference. If my grandmother is deeply and ‘irrationally’ afraid of elevators, and prefers to not use them even if it means she can not go to the post office, no one person or law will press her to have ‘treatment’ for this phobia. A phobia is integrated into a life, until it is becoming pernicious and a person wants to try to liberate herself from it. A strong bond, an addiction, can just as well be left alone, until a person wants to change. And if such change is difficult, because a bond feels like a chain that keeps someone captive, freely chosen assistance is the logical thing to ask for [23].

However, the difference we now construct between bonds in general and addictions in particular is a cultural construction. Having that construction supported by new techniques in neuro science does not make it less so.

Notes

1. Relative to all other forms from which it can be distinguished, this being is normal, even if relatively rare. (Translation P.C.)
2. I thank Nick Grahame (Indianapolis), Grazia Zuffa (Florence), Chip Huisman, Job Arnold, Erik van Ree, Erik Wolters (Amsterdam), Axel Klein (Salisbury), and Eliot Albers (London) for their insight and comments.
1. Interviews took place in September 2008, as preparation for a publication on 30 years of drug policy in the city of Amsterdam.
2. The working group on Substance Based Disorders of the American Psychiatric Association preparing DSM-V is deliberating about adding a new “Non-substance addictions,” category (e.g., internet gaming, eating, shopping, sexual activity)” Nov 2008 APA, see website APA on DSM Revision activities.
3. As with homosexual bonding, that stopped being seen as a psychiatric symptom of (developmental) disease.
4. Anonymous, US website 2008: “I know horses have personally changed me, whispered to me, taught me things beyond what a human could have taught me in the same amount of time, and they had endless more patience, too. Their power is my strength; their fight is my flight syndrome. Their race against the wind is the freedom in my own wild spirit. I have become “one” with these magnificent creatures and there is no place on earth besides my husband’s arms where I find the most comfort and joy but in the saddle, on a trail ride, bonding with my horse and feeling the wonder of closeness and nature all around us. That is a gift given, received, and shared all at once, between rider and horse that, to this day, writers of all genre have found inexplicable, but it’s a known fact that this entity of linkage between a girl and her horse is as unbreakable as any love that has gone before it, or after.” http://www.writing.com/main/view_item/item_id/1370587
5. Often the strong bonding that e.g. playing a violin entails is not registered in a conscious way because the bond is not threatened. People who disintegrate without their attachment to a job may learn this about themselves only when they get unemployed.
6. Craig Reinerman; “Addiction as accomplishment: The discursive construction of disease” *Addiction Research and Theory*, 2005.
7. I doubt that humans could ever escape the feeling of being trapped in a bond at certain times. The feeling of involuntary attachment is strong when the attachment becomes a burden e.g. when it collides with some idea of ‘health’. Our culture does not readily recognise the hardships of breaking a bond, since it hurts our alleged ‘autonomy’.
8. Gian Luigi Gessa “Cocaina” *Rubbettino Editore* 2008. (Translations from Italian P.C.) p 74.
9. Taco de Vries in *Synaps*. Vrije Universiteit Amsterdam November 2008 (Translation from Dutch, P.C.).
10. A Dutch documentarist interviewed a woman in Chernobyl, Ukraine, who returned to her farm and life style in spite of severe radiation risks. Her dedication to her habitat was much stronger than her fear of negative consequences of returning. VPRO ‘Europe’ March 1, 2009.

11. Cohen, Peter (1992), Junky Elend: Some ways of explaining it and dealing with it. From a pharmacological explanation of junky behaviour to a social one. *Wiener Zeitschrift für Suchtforschung*, Vol. 14, 1991, 3/4. pp. 59-64. Online: <http://www.cedro-uva.org/lib/cohen.junky.html>
12. Personal communication, 20 November 2008.
13. Terry E. Robinson and Kent C. Berridge “The neural basis of drug craving: an incentive-sensitization theory of addiction” *Brain Research Reviews*, 18 (1993) 247-291.
14. Kent C. Berridge and Terry E. Robinson “What is the role of dopamine in reward: hedonic impact, reward learning, or incentive salience?” *Brain Research Reviews* 28 (1998) 309-369.
15. Terry Robinson and Kent Berridge “The psychology and neurobiology of addiction: an incentive–sensitization view” *Addiction* (2000) 95 (Supplement 2) S 91-S117.
16. “Constructing the organ of deceit. The rhetoric of fMRI and Brain Fingerprinting in post 9/11 America”, *Science, Technology and Human Values*, 2009.
17. A recent British report discussing Brain Science and Addiction proposes 10 areas for further neurological research, none of which has to do with inquiries about the relevance of existing theories of addiction or the rigor of behavioral research of addiction. Page 61. Gabriel Horn et al., *Brain science, addiction and drugs*, 2008, London, Academy of Medical Sciences.
18. Bruce Alexander defines addiction as *never* successful because it is a 'substitute lifestyle' that replaces other types of liaison making under societal conditions of lack of integration. B. Alexander, *The roots of addiction in free market society*. Vancouver 2001. Canadian Centre for Policy Alternatives. See also Bruce Alexander, *The globalisation of Addiction*. Oxford University Press 2008. But what would happen if we distance ourselves from the view that addiction is 'substitute' and see it as 'genuine' instead? Would not we go the same way as we went in normalizing homosexuality or unwed motherhood? If people decide to follow lifestyles of classical drug 'addiction', what would happen if we cease to criminalize such lifestyles, and give them the space they ask, in the same way we allow people to dedicate their lives to chess?
19. ‘Examen critique de quelques concepts’, page 91 in Georges Canguilhem *Le normal et le pathologique* 2007 Presse Universitaire de France PUF. Translation from French P.C.
20. Prasad, Amid “Making Images/Making Bodies: Visibilizing and Disciplining through Magnetic Resonance Imaging (MRI)” (2005) In: *Science Technology and Human Values*, Vol 30 No 2, 291-316.
21. Christian G. Huber, *Interdependence of theoretical concepts and neuroimaging data* Poiesis Prax DOI 10.1007/s10202-009-0069-3, Springer Verlag 2009.
22. Cohen, Peter (2000), Is the addiction doctor the voodoo priest of Western man? Extended version of an article that appeared in *Addiction Research*, Special Issue, Vol. 8 (6), pp. 589-598. Online: <http://www.cedro-uva.org/lib/cohen.addiction.html>
23. We should never forget that the wish to escape from a bond can have clear social foundations. E.g. some attachments to particular drugs or particular sexual objects bring such devastating social consequences that people who have such attachments can be driven to wanting to part with them.