Addicted to Love
What Is Love Addiction and When Should It Be Treated?

Brian D. Earp, Olga A. Wudarczyk, Bennett Foddy, & Julian Savulescu

Abstract: Recent research suggests that romantic love may sometimes be literally addictive. Although the exact nature of the relationship between love and addiction has been described in inconsistent terms throughout the literature, we offer a framework that distinguishes between a *narrow view* and a *broad view* of love addiction. The narrow view counts only the most extreme, harmful forms of love or love-related behaviors as being potentially addictive in nature. The broad view, by contrast, counts even basic social attachment as being on a spectrum of addictive motivations, underwritten by similar neurochemical processes as more conventional addictions. We argue that on either understanding of love-as-addiction, treatment decisions should hinge on considerations of harm and well-being rather than on definitions of disease. Implications for the ethical use of anti-love biotechnology are also considered.

Keywords: Sex, oxytocin, psychiatry, well-being

> By nature we are all addicted to love . . . meaning we want it, seek it and have a hard time not thinking about it. We need attachment to survive and we instinctively seek connection, especially romantic connection. [But] there is nothing dysfunctional about wanting love. (Smith, quoted in Berry, 2013)

Throughout the ages, love has been rendered as an excruciating passion. Ovid was the first to proclaim: "I can't live with or without you"—a locution made famous to modern ears by the Irish band U2. Contemporary film expresses a similar sentiment: as Jake Gyllenhaal's character famously says in *Brokeback Mountain*, "I wish I knew how to quit you." And everyday speech, too, is rife with such expressions as "I *need* you" and "I'm *addicted* to you." These widely used phrases capture what many people know firsthand: that when we are in love, we feel an overwhelmingly strong attraction to another person—one that is persistent, urgent, and hard to ignore.

Love can be thrilling, but it can also be perilous. When our feelings are returned, we might feel euphoric. Other times, love's pull is so strong that we might follow it even to the point of hardship or personal ruin (Earp, Wudarczyk, Sandberg, & Savulescu, 2013). Lovers can become distracted, unreliable, unreasonable, and unfaithful. In the worst case, they can become deadly. In 2011, more than 10% of murders in the United States were committed by the victim's lover (Federal Bureau of Investigation, 2011). When relationships come to an unwanted end, we tend to feel pain, grief, and loss. We may even become clinically depressed, or withdrawn from society (Mearns, 1991).

These phenomena—including cycles of alternating ecstasy and despair, desperate longing, and the extreme and sometimes damaging thoughts and

behaviors that can follow from love's loss—bear a strong resemblance to analogous phenomena associated with more 'conventional' addictions, like those linked to drugs, alcohol, or gambling. Nevertheless, although we do sometimes use the *language* of addiction when referring to love, there is at least one major feature that distinguishes love from the kinds of substance-based addictions typically described in the psychological and medical literatures: nearly everyone aspires to fall in love at least once in their life. By contrast, nobody *yearns* to become addicted to heroin (for example), or cigarettes, or slot machines. So it might seem absurd on its face to suggest that there could be a *real* similarity between lovers and 'genuine' addicts. Surely, it is all just hyperbole and poetic license?

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Perhaps not. So numerous are the superficial similarities between addictive substance use and love- and sex-based interpersonal attachments, from exhilaration, ecstasy, and craving, to irregular physiological responses and obsessive patterns of thought, that a number of scientific theorists have begun to argue that both sorts of phenomena may rely upon similar or even identical psychological, chemical, and neuroanatomical processes or substrates (e.g., Burkett & Young, 2012; Fisher, Brown, Aron, Strong, & Mashek, 2010; Insel, 2003).[1]

The past decade has seen a dramatic increase in published studies on the neurobiology and neurochemistry of romantic love (for a recent overview, see Feldman, in press). Taken together, these studies suggest that the subjective state (or states) of "being in love" is intimately tied to characteristic biochemical reactions occurring within the brain. These reactions involve such compounds as dopamine, oxytocin, vasopressin, and serotonin and recruit brain regions known to play a role in the development of trust, the creation of feelings of pleasure, and the signaling of reward (Esch & Stefano, 2005). The involvement of similar neurochemicals and neural activities in processes associated with *addiction* has already been well established (Blum, Chen, et al., 2012). Consequently, scientists have begun to draw a number of parallels between the naturally rewarding phenomena associated with human love and the artificial stimulation afforded by the use of addictive substances such as alcohol, heroin, or cocaine (see Frascella, Potenza, Brown, & Childress, 2010).

Although the specific nature of these parallels has been described in inconsistent language, two main approaches to conceptualizing the relationship between love and addiction can be usefully teased apart. The first approach counts only the most extreme cases (or phases) of love and love-related behaviors as being potential instances of addiction. Research in this vein focuses on sexual compulsions, pedophilia, toxic or abusive relationships, abnormal attachments, and unhealthy tolerance of negative life and relationship outcomes (e.g., Carnes, 2005; Reynaud, Karila, Blecha, & Benyamina, 2010).

The second approach takes a wider view, and counts even 'normal' romantic passions as being chemically and behaviorally analogous to addiction (e.g., Burkett & Young, 2012; Fisher et al., 2010). Studies in this vein emphasize the commonality between the experience of someone under the influence of certain drugs and the quite *ordinary* experience of someone in love—including her "focused attention" on a preferred individual, "mood swings, craving, obsession, compulsion, distortion of reality, emotional dependence, personality changes, risk-taking, and loss of self-control" (Fisher et al., 2010, p. 51). Burkett and Young (2012, p. 1) go so far as to defend the hypothesis that basic *social attachment*—covering the whole course of love-based relationships from initiation to breakup—may be understood as a form of behavioral addiction "whereby the subject becomes addicted to another individual and the cues that predict social reward."

In this paper, we highlight some of the latest thinking on the nature of romantic love considered *as* an addiction, drawing on behavioral, neurophysiological, and neuroimaging studies of both love and addiction. By doing so, we hope to give a taste of, as well as clarify, the existing evidence in favor of these differing accounts. After that, we attempt to explore some of the *moral* and *practical* implications that begin to emerge once we recognize that:

(a) one can indeed become addicted to love, and
(b) to be in love is in some sense to be addicted—that is, to another person.

Our main thesis is that, on either understanding of love-as-addiction, there is a reasonable case to be made that, in some instances, 'treatment' of love could be justified or even desirable. We will also argue that respecting the lovers' autonomy should be paramount in any treatment decision. Along the way, we entertain some possible objections to our views, as well as offer our replies.

The Narrow View: Addiction as the Result of Abnormal Brain Processes

Although scholarly attitudes have been shifting in recent years, the dominant model of addictive drug use—among neuroscientists and psychiatrists, at least—is that drugs are addictive because they gradually elicit abnormal, unnatural patterns of function in the human brain (Foddy & Savulescu, 2010). On this 'narrow' view of addiction, addictive behaviors are produced by brain processes that simply do not exist in the brains of nonaddicted persons.[2]

One especially popular version of this view holds that drugs 'co-opt' neurotransmitters in the brain to create signals of reward that dwarf the strength of 'natural' rewards, such as food or sex. They thereby produce patterns of learning and cellular adaptation in the brain that could never be produced without drugs (e.g., Volkow et al., 2010). According to this strict account, then, addictive drug seeking is an aberrant form of behavior that is *peculiar* to drug addicts, both in form and in underlying function. It follows that natural rewards like food and love can never be truly addictive, and that food-seeking or love-seeking behaviors are not truly the *result* of addiction, no matter how addiction-like they may outwardly appear to be.

Other researchers, however, have noted appreciable behavioral similarities between binge eaters (for example) and drug users, and have flagged a growing body of evidence that is suggestive of neurological similarities as well (see Foddy, 2011). Sweet food, to take just one example, can elicit a reward signal in the brain as strong as the reward from a typical dose of cocaine (Lenoir, Serre, Cantin, & Ahmed, 2007). In addition, it can even induce—at least in rats—a withdrawal syndrome as strong as that induced by heroin (Avena, Rada, & Hoebel, 2007). If an illicit drug like cocaine, therefore, can produce 'abnormal' brain processes by providing abnormal and chronic reward, then so might an abnormally high *natural* reward, like the reward one gets from bingeing on food, or from experiencing unusually strong or frequent feelings of love. Given these considerations, a more plausible 'narrow' view of love addiction would hold that one can indeed be addicted to love, but only if these abnormal brain processes are present.

Indeed, a number of addiction theorists have argued that otherwise harmless love-related phenomena can *qualify* as addictive if they take on such an 'extreme' or maladaptive form—termed 'destructive' love by Fisher (2004), and 'unwise' or 'desperate' love by Peele and Brodsky (1975). One way to begin to understand love-related behaviors of this 'destructive' type is to use the framework of *process addiction* (Sussman, 2010; Timmreck, 1990). Process addiction—as opposed to substance addiction—typically refers to an obsession with certain *activities* such as sex, spending money, eating, or gambling. When a person in love repeatedly seeks contact with another individual—for physical intimacy, attention, or merely to be in the same room—it is often to secure momentary feelings of intense pleasure and to relieve obsessive thought patterns about the object of her passion. If this sort of behavior threatens the individual's (or another's) safety, mental or physical health, or incurs serious social or legal costs, it may rise to the level of an addiction (e.g., Sussman, 2010).

A further distinction has been drawn by Sussman (2010), following Curtis (1983), between *mature* love and *immature* love. Sussman suggests that only the latter may be considered a form of addiction. Rather than permitting mutual growth within the partnership, or contributing to increased self-esteem and well-being in both individuals, *immature* love is typified by power games, possessive thoughts and behaviors, obsessive concern over the partner's fidelity, 'clinging' tendencies, uncertainty, and anxiety. Love addicts

on this model "feel desperate and alone when not in a relationship," "continue trying to romance the love object long after the relationship has broken up," and "replace ended relationships immediately" despite such declarations as "I'll never love again" (Sussman, 2010, p. 34).

To summarize, a lover might be suffering from a type of addiction (on this narrow view) if she expresses one of a handful of *abnormal* sexual or attachment behaviors—perhaps underwritten by similarly abnormal brain processes—such that her quest for love 1) interferes with her ability to participate in the ordinary functions of everyday life, 2) disables her from experiencing healthy relationships, or 3) carries other clear negative consequences for herself or others. In the case of more ordinary examples of love—that is, the ones to which most people probably aspire—these feelings, behaviors, and ill consequences are not present, or are present only to a mild or manageable degree.

The narrow view of love addiction is *narrow*, then, in the sense that it sees only extreme, radical brain processes, attachment behaviors, or manifestations of love as being potentially indicative of addiction—and hence it is thought to be quite rare. For example, Timmreck (1990) has estimated that love addiction of this type may affect between 5% and 10% of the U.S. population. By contrast, 'healthy' romantic love, which is assumed to be much more common, is described by scholars such as Sussman (2010) as being benign or even beneficial. Such love is said to have evolved, for example, for adaptive and still-useful ends, such as the promotion of procreative behaviors and the facilitation of cognitive and social learning. Reynaud et al. (2010, p. 262) distinguish between love addiction and mere "love passion," which they describe as "a universal and necessary state for human beings." And Peele and Brodsky (1975) refer to "genuine" love that, unlike the self-seeking dependency associated with addictive love, involves a commitment to mutual growth and fulfillment between the partners involved.

As we explore in the following section, however, other researchers, notably Burkett and Young (2012), have begun to highlight the similarities between addiction and even 'normal' romantic relationships by emphasizing the common behavioral, neurophysiological, and neurochemical signatures of both.

The Broad View: Love *as* Addiction

There is a broader understanding of addiction that has been gaining steam in recent years. As two of us have argued, addiction should be considered to be a *spectrum of motivation* that emerges from the repeated application of any type of reward, including drug rewards, gambling rewards, food rewards, and sexual rewards (Foddy, 2011; Foddy & Savulescu, 2010). These appetite motivations arise in response to reward conditioning, and are, indeed, the evolved mechanism by which we humans and other animals learn to behave in survival- and reproduction-enhancing ways. At the same time, such appetites do not always lead directly to these 'evolutionary' outcomes, especially in humans, and even more so in the modern environment we have created for ourselves (see Earp at al., 2012). Our appetite for food, for example, is not strictly genetically controlled: we are weaned onto it during gestation, and it can wax and wane over the course of our lives, often in ways that run contrary to our real nutritive needs (Foddy, 2011). By the same token, we may develop appetites for *any* rewarding behavior, and these appetites may exceed or fall beneath a level that suits our biological needs, our social values, or our personal preferences.

On a broad view, then, addictions are simply appetites: they are felt needs that can be satisfied temporarily, but that become urgent and distracting if one abstains from fulfilling them for too long. Conversely, and perhaps counterintuitively, appetites are simply weak addictions. At least on this account, then, almost *everyone* is 'addicted' to food, to sex, and to other ordinary substances and behaviors, although most of us are not 'hooked' on them to such a degree as to cause us any major harm or distress or to merit the application of a psychiatric diagnosis or treatment (see Foddy & Savulescu, 2010, for a sustained defense of this view).

A similar broad approach can be applied to the concept of love addiction. This approach would claim that to love someone is literally to be addicted to them, although perhaps only weakly. In line with this view, James Burkett and Larry Young (2012) have recently argued that romantic relationships experienced universally—from 'falling in love' to ultimate separation and subsequent withdrawal—may be considered a form of addiction. To prime the reader for their thesis, they open their seminal paper on this subject with the following vignette:

> At first, each encounter was accompanied by a rush of euphoria—new experiences, new pleasures, each more exciting than the last. Every detail became associated with those intense feelings: places, times, objects, faces. Other interests suddenly became less important as more time was spent pursuing the next joyful encounter. Gradually, the euphoria during these encounters waned, replaced imperceptibly by feelings of contentment, calm, and happiness. The moments between encounters seemed to grow longer, even as they stayed the same, and separation came to be filled with painful longing and desire. When everything was brought to an abrupt end, desperation and grief followed, leading slowly into depression. (Burkett & Young 2012, p. 1)

Does this story describe falling in love or becoming addicted to a drug? Burkett and Young's point, of course, is that it could equally describe both. Drawing on evidence from animal models along with parallel research in human attachment and the neurobiology of substance abuse, they conclude that there is "a deep and systematic concordance . . . between the brain regions and neurochemicals involved in both addiction and social attachment" (Burkett & Young, 2012, p. 2).

In other words, substance dependence and everyday romantic bonding have much more in common than their outward psychological profiles. At the level of the brain, the mechanisms underlying pair bonding in socially monogamous or quasimonogamous species (such as humans) overlap quite substantially with those involved in reward learning and addiction (see, e.g., Wise, 1996). The greatest overlap occurs in neurochemical regions involved in the processing of dopamine (Burkett & Young, 2012; Kelley & Berridge, 2002), oxytocin (Insel, 2003; McGregor, Callaghan, & Hunt, 2008), and other neurotransmitters such as serotonin. As Margolis (2005) states, "through sex [with our partner], orgasm's serotonin rush and momentary muscular relaxation comprise the most potent and popular drug we have."

With respect to dopamine, both mating and addictions elicit very similar neurochemical activity, concentrated in the reward circuitry of the brain: sex, orgasm, and all known drugs of abuse stimulate high levels of dopamine release in the nucleus accumbens (see Burkett & Young, 2012; Di Chiara et al., 2004; and Kirsch et al., 2006 for more information). In fact, the role of dopamine extends far beyond addiction and is linked to a wide range of other processes associated with reward learning—including eating, drinking, having sexual intercourse, and love (see Burkett & Young, 2012, for a review). Some scientists have suggested that this dopaminergic overlap may explain why experiencing feelings of love or engaging in sexual activity can feel like a cocaine rush (Bartels & Zeki 2000; Blum, Werner, et al., 2012).

Finally, neuroimaging support for an overlap between love addiction and drug addiction comes from studies in which participants have been exposed to images of their romantic partners during scanning. These images evoke not only self-reported feelings of love and positive affect but also show heavy activation in the brain's reward regions (Aron et al., 2005; Bartels & Zeki, 2000; Fisher, Aron, & Brown, 2006).

These are just a few of the neurochemical and functional similarities between 'normal' love attachment and drug addiction that have been noted by Burkett and Young as well as by other researchers who argue for the 'broader' view of love addiction. There are many others as well. But what about *differences* between love and addiction? Surely the numerous 'parallels' between these phenomena—at both the behavioral and neural levels—should not be taken to mean that they are *strictly* equivalent. In the following section, we examine some of these differences, and assess their implications for the 'broad' versus 'narrow' debate.

What about Differences?

Although there is a significant amount of 'concordance' between love and addiction on several levels of analysis, there are some important differences between naturally rewarding activities (such as those associated with being in love) and the *artificial* stimulation of the reward system that occurs during drug use. As we will see, however, these differences are less significant—in terms of establishing a distinction in kind between love-based and drug-based addiction—than they may seem to be at first glance.

One such difference, at the level of the brain, concerns the duration of the effects of the stimulus. The release of signaling molecules in the case of love-related experiences—such as sexual intercourse—may not be as long-lasting as the analogous release stimulated by the use of some addictive drugs (Esch & Stefano, 2005). Natural rewards are highly controlled by feedback mechanisms, which may lead to a quicker return to 'baseline' by promoting (for example) an aversion to engaging in the same rewarding activity immediately after the pleasant stimulation (Small, Zatorre, Dagher, Evans, & Jones-Gotman, 2001). For example, the building up of sexual desire often precedes a sexual act (e.g., Heaton & Adams, 2003), after which it quickly decreases and then takes time to recover its initial level of intensity. Addictive stimulants, on the other hand, often rebuild high levels of desire immediately after drug consumption (e.g., Nestler, 2005). From this it is often argued that drug-seeking activities override other motivations more easily than activities associated with the pursuit of 'natural' rewards (Esch & Stefano, 2004).

Even granting this view, however, it must be remembered that the neurodynamics of even 'conventional' addictive drugs are not all the same, since their mechanisms of action vary so widely (Nestler, 2005). Nonstimulant drugs such as alcohol, opiates, and benzodiazepines, for example, are *not* as quick to rekindle cravings as stimulants are, and they can even induce an appetitive regret that is similar to the regret lovers experience as 'postcoital malaise' (cf. Le Moal & Koob, 2007; Norville, Sweeney, & Elliott, 2010). More important, the feedback mechanisms that control the processing of 'natural' rewards are not always reliable, nor are the neurological signals from natural rewards always weak. Some 3% of American adults suffer from binge eating disorder, in which their complex satiety system, which should alert them to the state of being full, is so dysregulated that these individuals can regularly eat enormous quantities of food in a fevered 'binge' (Foddy, 2011). When these same individuals binge on sugary food, they can experience a level of neurological reward that surpasses a dose of a drug such as cocaine (Lenoir et al., 2007). The evidence, therefore, suggesting that drugs of abuse are inherently better-suited to causing addiction than are other types of reward is mixed at best.

How else might 'being in love' be taken to differ from being addicted to certain drugs? For one thing, although drug addiction is a circumscribed problem, affecting a mere fraction of the global population, romantic love is a *universal* phenomenon, emerging from basic, evolved subsystems that helped our ancestors to successfully pursue mating opportunities with preferred partners (see Savulescu & Sandberg, 2008). In other words, love is deeply bound up with reproduction, which is the engine of natural selection (Blum, Chen, et al., 2012). Drug use, by contrast, serves no clear function with respect to survival or reproduction, and it has often been described as 'hijacking' the mechanisms underpinning the natural reward functions of the brain, supplanting more 'adaptive' behaviors with entirely artificial ones that are irrelevant to genetic fitness (Hyman, 2007). Taking a complementary view, Fisher (2004) has argued that romantic love might be considered a 'constructive' form of addiction when one's love is reciprocated, whereas it is presumed that drug addiction would never be constructive. And although we can flourish without ever taking drugs, we cannot do so if deprived of food, or, indeed, some measure of love and human affection.

However, these considerations do not entail that love addiction, food addiction, and drug addiction are different in kind. Binge eating is in fact extremely detrimental to one's chances for long-term survival, just as extreme forms of love-related phenomena—such as an insatiable appetite

for sex—can lead to such negative outcomes as interpersonal problems, sexually transmitted diseases, loss of employment, or even imprisonment (Carnes, 2005). *No* extreme pattern of reward seeking, whether it is for food, sex, romantic love, or drugs, is likely to promote a person's chances of flourishing in the modern world—and any normal capacity can be taken to extremes (see Earp, Sandberg, Kahane, & Savulescu, 2014).

Moreover, although a moderate appetite for so-called 'natural' rewards is quite plainly beneficial, it would not be unreasonable to make a similar claim regarding certain drugs to which people can sometimes become addicted—at least if we view pleasure as being one important source of the good. Nobody strictly *needs* drugs to flourish, but in some circumstances, and for some people, some nontherapeutic drugs could certainly be considered compatible with human flourishing if taken within reason, such as the moderate consumption of alcohol.

Finally, there is the fact that love must be requited for it to deliver its full benefit. Lovers rarely regret being in love if the love is returned, and indeed a significant part of the suffering associated with falling in love stems from romantic *rejection*, or *withdrawal* of love—rather than from love itself. Substance addicts, by contrast, are never rejected by their drug in the same way, so perhaps there is a difference in this regard as well. Even so, there are some apparent parallels on this dimension that complicate the notion that love addiction and drug addiction are totally incommensurable phenomena.

For example, consider the fact that the *difficulty of obtaining drugs* can be the source of many, if not most, of the problems that drug addicts experience. Access to drugs is constrained by scarcity, cost, illegality, and social stigmatization in addition to any biological (side) effects. Some of the destructiveness of drug addiction occurs because an addict is unable to afford her drug and turns to crime, because her friends and family reject her for taking the drug, or because she cannot obtain her drug and goes into withdrawal. The addiction itself is not clearly the cause of most of the associated harms. Therefore, we can draw at least a tenuous analogy here, too, between a lover who is rejected and a drug user who cannot access her drug of addiction.

Taken together, these considerations show that although there are indeed some differences between love-based and drug-based addictions, these differences may have more to do with the *frequency* of problems at the population level, or with the typical *degree* of reward stimulation involved in particular cases, than with any clear incommensurability in kind.[3]

Broad or Narrow?

The behavioral, psychological, and neurophysiological evidence concerning love, love-related phenomena, drugs of addiction, and the parallels between them, paint a very complicated and hotly debated picture. Just within the drug addiction literature—holding 'love addiction' to one side—there is little agreement about whether the 'narrow view' or the 'broad view' of addiction is to be preferred. In other words, there is (as yet) no meaningful consensus about whether it is the case that addictive drug-related desires are a) of an unnatural form that is not present in the non-addict (the narrow view), or b) whether they are on a continuum with 'regular' appetitive desires and, therefore, simply a strong form of the same underlying phenomenon (the broad view). The available neuroscientific and behavioral evidence simply cannot settle the question firmly one way or the other.

The same is true regarding 'love addiction.' Should only the most extreme, compulsive, or harmful love-related phenomena be considered potential forms of addiction? Or, as Burkett and Young (2012) have recently suggested, might it be the case that there is a neurological equivalence or near-equivalence between quite ordinary experiences associated with falling in love, being in love, or even basic social attachment itself, and addictions of a more conventional stripe? Much more work is needed, we suggest, both empirical and conceptual, to arbitrate between these differing views.

At a minimum, however, the evidence we have discussed in this article suggests that drug addiction, on the one hand, and *at least certain* love-

related experiences or behaviors, on the other, can reasonably be understood to be equivalent phenomena at the level of the brain, underwritten by the same neurophysiological processes. If this is correct, it cannot be the case that (narrow) addiction is a phenomenon confined to addictive drugs. Holders of the narrow view must instead claim that addiction is a term we can apply to any person who has undergone chronic and unusually strong (pleasurable) experiences—intense drug reward in the case of drug addicts, food binges in the case of binge eaters, or powerful personal attachments in the case of love addicts.

Based on this premise, in the next section, we explore some of the practical and ethical implications that arise when we acknowledge that love has (or can have) addictive characteristics, *at least* on the narrow view, but also possibly on the broad view as well.

Ethical Implications: Two Mysteries

The science and philosophy of addiction—generally speaking—have sought to solve two basic mysteries. The solution to these mysteries, in the case of love addiction as much as for any other purported form of addiction, will have important practical and ethical implications.

First, we have sought to learn whether, or to what degree, those who suffer from addictions are capable of *abstaining from* or *moderating* their reward-seeking behavior; and second, we have been very interested to know whether—and how—we can help people to *recover* from addiction using various treatment modalities. We consider these 'mysteries' in turn as they relate to the notion of love addiction in the following sections.

Autonomy and Responsibility

The first longstanding mystery concerning addiction in general is whether addicts are capable of *abstaining from* or *moderating* their drug use or other problematic behaviors. The solution to this mystery would have some indirect implications for the medical treatment of addicts, but it has much stronger philosophical and ethical implications: for example, is it reasonable to *force* addicts to abstain? It is reasonable to hold them *morally* or *criminally* responsible for their drug taking? What about for illegal actions they commit in *pursuit* of their drug? These deep empirical and conceptual problems date back at least as far as the time of Plato, who wondered how a responsible person could continue to choose courses of action that she would predictably come to regret.

Naturally, this issue does not apply to love in precisely the same way as it does to paradigmatic cases of substance addiction. We do not ordinarily *choose* to love someone (at least not consciously) and it would be a hard thesis to defend that we should be held *responsible* for falling in love—even though such an occurrence can have very far-reaching, and sometimes destructive, consequences for those involved. We cannot criminalize falling in love, and although history is replete with stories of people having been punished for falling in love with the 'wrong' person, such punishment would seem cruel or even absurd by today's standards.[4]

However, although the formation of love seems to be at least largely involuntary (but see Fromm, 1956), there is a real question regarding how autonomous one's behavior is once one is, in fact, in love. People who are in love make choices every day about how to express their feelings: whether to seek proximity with their loved one, for example, or whether to seek physical affection (and by what means), among numerous other decisions.

If addictive love is nothing more than a symptom of abnormal brain processes (i.e., the narrow view), then the choices and behaviors it elicits might be considered to be inauthentic or in some sense *nonautonomous* reflexes of those 'deviant' processes. Hence, proponents of the narrow view of substance addiction have frequently argued that addicts lack control over their actions and are not fully autonomous (Hyman, 2007). This idea is also reflected in the common concept of 'crimes of passion'— and indeed the law has traditionally taken such passion into account in sentencing decisions.

If this is the correct view, then we might think that it would be reasonable to try to eliminate the problematic feelings and behaviors associated with addictive love, because they are merely the symptoms of 'disease' (on some description). And we might even believe that we could be justified

in using *coercion* or *force* to prevent a love addict from being near the object of her desire. An analogous view is held by scholars such as Caplan, who have argued that we are justified in overriding a drug addict's choices in the name of restoring her autonomy (Caplan, 2008). Indeed, we, too, have argued previously that in some domestic abuse situations, including Stockholm Syndrome-like cases of attachment between a victim and her abuser, coercive intervention may sometimes be morally justifiable (Earp et al., 2013; see also Earp, Sandberg, & Savulescu, 2015 and 2016).

The broad view, by contrast, argues that even the strongest, most negative forms of love are merely extremes of an authentic emotion. Hence, it is possible to argue, from these grounds, that even those people who suffer from harmful extremes of love may be fully autonomous in their behavior. On this kind of view, any possible treatment modality would then differ along certain dimensions. The goal should not be to eliminate the feelings of love entirely, because those feelings are authentic aspects of the person's mind and personality, but rather it should be to moderate them (or their consequences) instead. Likewise, treatments should never violate the autonomy of the person in love, nor should they involve coercion or force of any kind. Two of us have advanced a similar point of view regarding treatment for substance addiction (Foddy & Savulescu, 2010).

Treatment and Recovery

These considerations bring us to the second 'mystery' concerning addiction, namely, whether treatment is appropriate or advisable and whether recovery is possible. Although one would not normally think of offering 'treatment' to individuals who are in love, once we begin to realize that at least some cases of love and love-related phenomena are highly similar to behavioral or substance addictions—in form and function, as well as in effect—then the possibility becomes worth taking seriously. Indeed, the idea of an anti-love remedy or a 'cure' for love has deep historical roots. As we noted in a recent paper:

> references [to such 'cures'] may be found in the writings of Lucretius, Ovid, Shakespeare, and many others, and are tightly linked to the notion that love or infatuation—under certain conditions—can be just like a serious illness: bad for one's physical and mental health and, in some cases, profoundly damaging to one's overall wellbeing. (Earp et al., 2013, p. 3)

In other words, the possibility of treating love—under the right conditions—may not be so far-fetched after all. Importantly, the way in which we approach this possibility depends on whether we subscribe to the broad view or the narrow view of love addiction as outlined above. Yet, as we show in what follows, the general *conclusion* of such an analysis may not differ very much in the end, regardless of the view one takes. That is, love addiction—*however it is conceived*—would seem to be an appropriate candidate for treatment in at least some circumstances. Or so we argue in this section.

Recall: the narrow view considers that love is only an addiction (or at least addiction-like) in rare or abnormal cases, generated either by preexisting pathophysiology or by chronic ultra-strong 'doses' of love-based reward. On this kind of view, love addiction is a neurobiological disorder that has no place in a healthy or flourishing life, and it follows that we ought to offer love addicts some measure of treatment or support. Furthermore, on the narrow view, we might expect that the best course of action is a standard psychiatric treatment modality, in which we try to restore normal neurophysiology using psychiatric drugs and/or cognitive therapy. For example, just as heroin addicts are sometimes given oral naltrexone to block the pharmacological effects of their drug, we could potentially use oxytocin antagonists to reduce the reward an individual receives from being close to the object of her affection (see Earp et al., 2013).

According to the broad view, by contrast, *everyone* who loves is on a spectrum of addictive conditions: being addicted to another person is not an *illness* but simply the result of a fundamental human capacity that can sometimes be exercised to excess. On this view, it can be objected that love—no matter how destructive—is never an appropriate object of psychiatric treatment. A similar notion is that we now know that homosexuality is within the range of normal human variation and is, for this and other reasons, not appropriately considered a disease.

Yet this is where the distinction between broad and narrow begins to break down. On *both* views, that is, the primary difficulty from an ethical point of view is to determine how we ought to distinguish the good kinds of love from the bad: the innocuous or even the beneficial from the dangerous and the harmful. As one of us has argued, in cases of mental illness it can be very difficult to sort pathology from normal function, especially in the grey areas between extremes (Savulescu, 2009). Current theories of brain function are nowhere near advanced enough to tell us whether a particular individual's emotions fall within statistical norms; and, even if science *could* tell us such a thing, we would still need to make value judgments to define which part of the statistical curve is desirable. For example, we arbitrarily define anyone with an IQ two standard deviations below the mean as being intellectually disabled—and hence deserving of special treatment—but we could just as easily have put the bar at one standard deviation, or three.

Nearly every psychiatric disability or disease represents an extreme of a smooth spectrum of behavior, function, or capacity. Not all sad people are depressed, and not all energetic people are manic. Our definitions of psychiatric illness, therefore, are essentially holistic rather than purely naturalistic; they are based inevitably on value judgments. At base, these judgements relate certain states of biology or psychology to well-being: when a state either constitutes or creates harm, it may come to be defined as a disease and thereby mark itself out as a candidate for treatment.[5]

Given this inherent value-ladenness, we suggest that in defining some condition as a disease or a disorder, we should consider a range of different outcomes that would result from the application of such a label. We must consider who we think should have *excuses* for their behavior; who should receive *support* from the community or from the state; who should be an object of *medical* research; and (above all) who should receive *treatment*. These outcomes must be assessed on a range of moral and practical grounds, such as the suffering experienced by the afflicted person, the degree to which her 'addiction' undermines her ability to act on her preferences or execute her plans, and the extent to which it compromises important social relationships, impedes the development of her talents, impoverishes her interaction with the world, and so on.

In line with this view, consider the definition of substance dependence from the latest available (at the time of writing) edition of the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* from the American Psychiatric Association (DSM-IV): "When an individual persists in use of alcohol or other drugs *despite problems related to use of the substance*, substance dependence may be diagnosed" (American Psychiatric Association, 2000, p. 194, emphasis added). As this quotation makes plain, the existence of 'problems'—a normative concept—is inherent in the definition of the disorder. In other words, it matters fundamentally whether harm, difficulty, or ill-consequences are associated with the reward-seeking behavior: the reward itself is not the problem. Furthermore, and consistent with our arguments in this paper, addiction theorist Stanton Peele (quoted in Curley, 2010) has suggested that next edition of the DSM—volume 5—should include 'life-harming, compulsive' involvement with sources of reward such as sex and food in the category of addiction. Here, too, the notion of 'life harm' is built into the very concept of the disorder in question.

What insight do these considerations bring to our understanding of love addiction and its potential for being an appropriate subject of treatment? The message by now should be clear: *regardless* of whether we understand the love-related phenomenon to be the result of abnormal brain processes, or simply the manifestation of a strong appetitive desire, the key determinants for labelling and treatment should be the degree to which the individual is harmed by the love through its deleterious impact on her well-being, as well as the stability of this harm given her physical and social environment, and the various means by which it could best be reduced. In the next section, we examine this perspective in greater detail.

Love Addiction and Well-Being

There are three main theories of well-being—or classes of theories—discussed throughout the

literature (Griffin, 1986; Parfit, 1984). How one relates love addiction to well-being, and therefore to treatment, will depend upon the theory (or theories) of well-being one finds most convincing.

The first class of theories concerning well-being are *hedonistic theories,* which are usually defined in terms of mental states. The simplest account of this type of view is that happiness, or pleasure (understood broadly as a mental state) is the only intrinsic good, whereas unhappiness or pain is the only intrinsic bad. More complex hedonistic views include a greater plurality of states of mind as possibly contributing to (or constituting) well-being: for example, Freud is reputed to have refused analgesia when dying of cancer—although he was in great physical pain—on the grounds that he preferred to be able to think clearly in a state of torment than foggedly in a state of drug-induced comfort (see Griffin, 1986).

Yet, however one construes[6] this hedonistic mental state view, it is clearly possible that a person could prefer to exist in a rapturous state of love, even though it might yield a number of adverse consequences in other areas of her life, owing to its irrefutably high, intrinsic hedonic value. Indeed, in Western societies, being in love is widely considered to be an extremely valuable state, and possibly constitutive of a good life all on its own. This notion is captured in the ideal of 'dying for love' with the implication being that such a love might even be the very meaning of life.

The second class of theories concerning well-being are *desire fulfillment* theories. According to these theories, well-being consists in having one's desires fulfilled. They give weight to individual values and yet they account for the plurality of values that might differ across individuals: economic theories commonly use a related notion of value, and such accounts are widespread in philosophy and in the social sciences in general. On the most plausible desire fulfilment theories, desires should be informed (of the relevant facts) as well as freely devised—that is, not forced upon one in any way—to count toward one's well-being.

Could love addiction be consistent with well-being on this desire fulfillment account? It does seem possible. Specifically, if a person desired, freely, to exist in a state of extreme passion—even granting certain negative outcomes—while nevertheless being fully informed about the nature of addictive love, how it might affect her brain, and so on, then love addiction and well-being might indeed coincide in such a person. On this view, treatment might *not* be appropriate, even though negative consequences were present.

Finally, there are *objective list* theories of well-being. According to these theories (sometimes called *substantive good* or *perfectionistic* theories), certain things can be good or bad for a person—and thus contribute to her well-being—whether or not they are desired and whether or not they lead to a 'pleasurable' mental state (for a recent discussion, see Earp & Darby, in press). Examples of the sorts of things that have been proposed as being intrinsically good in this way are gaining knowledge, having deep personal relationships (including being in love), engaging in rational activity, and developing one's abilities. Examples of 'objectively' bad things include being betrayed, being deceived, and gaining pleasure from cruelty.

On *this* type of theory, it might be harder to square love addiction with any genuine sort of well-being—especially on the 'narrow' view. That is, one could plausibly argue that only 'normal' or 'healthy' or 'constructive' kinds of love are *objectively* constitutive of well-being, whereas love that is extreme, compulsive, resultant from abnormal brain processes, or that carries negative consequences for one's health or for other social relationships is *objectively* bad for one. If this were the case, then such a love could potentially be deserving of some form of treatment under the right conditions.

Yet what theory of well-being should one accept? Unsurprisingly, philosophers have long noted that each of these theories of well-being we have just outlined captures *something* important and intuitive about what is needed to live a good life, but all have problems as well. Accordingly, many philosophers opt for a *composite* theory in which well-being is seen as requiring at least certain aspects of all of the theories. On this composite view, then, well-being is constituted by engaging in objectively worthwhile activities, which we desire, and which provide us with pleasure or other valuable mental states (Savulescu, 2007).

To summarize, love will clearly be an important component of any plausible theory of well-being. However, on a composite view, especially one that incorporates aspects of the objective list account, love that entails unsufferable pain, that frustrates other important desires, or that stops one from engaging in objectively worthwhile activities, might reasonably be taken to compromise well-being. The best life is not one that is consumed by destructive or maladaptive forms of love, but is rather one in which love finds a robust harmony with other sources of the good.

Implications for Treatment

What does all of this mean for treatment? With respect to the narrow view of love addiction, it means that we will need to make an ethical judgment about *how narrow* the diagnostic category should be. How strong or destructive does love have to be to qualify as addictive love? On the broad view, we face a similar challenge. Although it is that case that, on this view, *everyone* who loves is technically addicted, only some subset of cases should be judged to be appropriate candidates for treatment because of their effect(s) on other aspects of our well-being. Though the two views take radically different stances on the neurobiological underpinnings of problematic love, it is still the case that for both views it is the *negative consequences* or harm of the 'bad love' that determine whether the person or people involved should be considered appropriate subjects for the application of some remedy.

To reiterate: the primary diagnostic criterion for love addiction, in our view, should *not* depend very much on whether we agree with the narrow or the broad interpretation of the available neuropsychological evidence. Instead, our allocation of medical and social care should be informed by an appeal to how much a person is made to suffer (or to experience other threats to well-being) through his or her experience of love (Kahane & Savulescu, 2009). If we determine that medical or social intervention could be of benefit to a person, then it will be at least potentially appropriate to offer some degree of treatment or support.

How Would It Work? The Prospect of Anti-Love Biotechnology

Treatment of love addiction, like any other kind of addiction, could take many forms. The most plausible starting place would be 'traditional' therapies such as professional counselling, cognitive–behavioral techniques, psychoanalysis, or some combination of these and other widely-used treatment modalities that work primarily on the psychobehavioral level (see Earp at al., 2015). At the same time, considering the recent surge of research focusing on possible *neurobiological* sources of love addiction, it may soon be possible to devise adjunctive drug-based therapies that could facilitate treatment of problematic forms of love by working directly on relevant neurochemical substrates. In a recent paper (Earp at al., 2013), we identified four conditions for the ethical use of such anti-love biotechnology:

(1) the love in question is *clearly* harmful and needs to dissolve one way or another;
(2) the person must *want* to use the technology, so that there are no problematic violations of consent;
(3) the technology will help the person follow her higher-level goals and commitments instead of her conficting lower-level drives and feelings; and
(4) it is not psychologically *possible* (or it is at least exceedingly difficult) to overcome the perilous feelings without the help of anti-love biotechnology; or, at the *very* least, nonbiotechnological methods have already been tried or thoroughly considered.

In addition, we have suggested that any drug-based treatments of love or love-related phenomena should be undertaken *only* under the guidance of a trained professional, and *only* once the safety and efficacy of such treatments had been established via rigorous clinical testing (Wudarczyk, Earp, Guastella, & Savulescu, 2013). Moreover, we have argued that such technologies should not be used on minors, that is, before an age of consent (see Earp, Sandberg, & Savulescu, 2014; Maslen et al., 2014; and Vierra & Earp, 2015).

Concluding Remarks

In this article, we have argued that there is now abundant behavioral, neurochemical, and

neuroimaging evidence to support the claim that love is (or at least that it can be) an addiction, in much the same way that chronic drug-seeking behavior can sometimes appropriately genuinely signal an addiction. And we have argued that no matter how we interpret this evidence, we should conclude that people whose lives are negatively impacted by love ought to be offered support and treatment opportunities analogous to those we extend to substance abusers.

It must be acknowledged that, by suggesting any sort of equivalence between love, which is culturally admired above all other emotions (or relational states), and addictive drugs, which are deeply and almost universally demonized, we are raising a comparison that many will find off-putting or even offensive. In Western society, we hold love—or even just *falling* in love—in very high esteem. To speak of romantic passion and destructive drug use in the same breath might only serve to conjure images of punishing people for falling in love, stigmatizing them, or forcing them out of their lover's arms and into a treatment program. We do agree that these would be inappropriate, and even dangerous ways to treat people who are suffering from a harmful sort of love or love gone bad.

But if falling in love is not so different, behaviorally or biologically, from developing a drug habit or a binge eating problem, then perhaps this recognition could afford the opportunity to deeply interrogate our views about the inherent harms of addiction. Perhaps, instead of adopting the view that love *must* be harmful if it is addictive, we could take the reverse view, and wonder if even substance addictions might not always be strictly harmful under the right sorts of conditions. At least in principle, it would seem that drug addiction could even be good for us if the drug were plentiful, safe, and legal, in much the same way that, on the converse, romantic love may be *bad* for us if the object of our affection is cruel, or unfaithful, or uninterested. If the evidence shows that the two phenomena are identical or even just substantially overlapping in nature, then perhaps we should revisit our attitudes to both. The ultimate goal, whether the subject is drug use or romantic passion, should be to identify those cases in which the behavior and its related phenomena cause harm and suffering to those involved. And any treatment that *is* pursued—on either the narrow view or the broad view of addiction—should be undertaken in such a way that the decision-making autonomy of the lovers is given maximal consideration.

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Notes

1. We are careful to note that *just because* two higher level phenomena (concerning, e.g., human behavior and/or subjective experience) involve similar or even identical neurochemical mechanisms does not by itself show that they are 'really' the same phenomenon—just as two events having similar causes does not mean they are the same event. Much depends on the level of analysis one is concerned with, and how one conceptualizes the two phenomena at each relevant level. For further discussion, see our paper, "Neuroreductionism about sex and love" (Savulescu & Earp, 2014).

2. This has also been called the 'brain disease' model of addiction (see Levy, 2013, for a critique). As a reviewer for this paper notes, "Some supporters of [the] disease model of substance addiction think that addiction is literally a brain disease, while others [are inclined] to think of it as a behavioral disposition towards excessive and/or harmful consumption—a disposition that does not literally take away control over consumption, even though it may seem that way to the addict. [This raises] important questions … about whether addiction can really be 'treated' at all (e.g., according to the 'Rational Recovery' approach to alcoholism, you can no more 'treat' drinking than you can 'treat' dancing; both are voluntary activities, although addicts find it much harder to stop)." As we make clear in our paper, even if love addiction is understood as being a behavioral disposition that makes it hard for one to avoid causing harm (to oneself or others), 'treatment'—in the sense

of a structured intervention, undertaken with the guidance of a trained professional (whether this involves the use of 'medical' technologies or not; see Earp et al., 2015)—could be justified under the right conditions.

3. At the conceptual level, of course, there may be other differences as well. As a reviewer notes, "One might argue that love aims at union with another person, whereas drug use aims at consumption; one could [also] say that a proper understanding of love must be holistic in a way that understanding drug use need not be. (For example, if we say that someone is in love, that suggests they have a range of concepts—of a person, of reciprocity and individuality—that need not be attributed to someone with an urge to consume a substance.) [Finally, the] typical aims of romantic love—most obviously, the desire to be loved in return—[are not necessarily] true of consumption, whether of a person or of a drug." We do not disagree with these observations (see Earp & Savulescu, 2016). However, we have deliberately kept our philosophical account of love 'thin' because there is no authoritative definition to which we could appeal (see Earp et al., 2013; Earp & Savulescu, in press), and because we expect that different readers will have very different notions of what love 'really is' (in terms of necessary and sufficient conditions) at the highest level of conceptual analysis. Thus, we speak of 'love-related' behaviors or feelings, which can be explained reasonably well in terms of neurobiology or lower-level functional mechanisms, and we leave it to the reader to decide what the implications are for his or her own philosophical conception of love. For further discussion, see Earp et al. (2015) and Earp and Savulescu (in press).

4. There *is* an interesting question here about the extent to which people can influence their own likelihood of forming a love-based attachment with another person. Certainly, there are enabling behaviors and conditions, and a person might very well have the power to shape these variables in such a way as to enhance, or diminish, the likelihood of falling in love with a particular person. Indeed, in arranged marriages, such as are common in some non-Western contexts, the partners might consciously (and intentionally) engage in activities, behaviors, and ways of thinking that allow for love to develop over time. Referring to such cases, Erich Fromm (1956) famously argued that love should not be thought of as something that one 'falls into' but rather as a capacity (or even an art) that one learns to develop and exercise. Nevertheless, even if one concludes that people cannot really 'make themselves' fall in love, as a reviewer notes, they *can* make a choice as to whether they will love 'unconditionally'—that is, "weather the storms of loving another person." As this reviewer writes, "It takes voluntary commitment to love enduringly [and] autonomy may [actually] be enhanced by such commitments." For further discussion, see Frankfurt (2004).

5. It is important here to distinguish between physical and psychiatric disease. Physical disease is characterized by reasonably clear pathology. Naturalistic or 'biostatistical theories such as that advocated by Boorse (1997) may be the best account of physical disease. However, there is no clear pathology in many psychiatric diseases at present. In practice, defining some mental state or series of states as a disease typically involves consideration of the impact of those states a person's life, and on the most plausible and effective ways of changing them, if necessary, in a desired direction. This notion serves as a backbone for our ethical arguments in the sections following this endnote marker.

6. A central issue for pluralistic accounts of hedonism is *which* mental states are to be included in an account of well-being. Two types of answer to this question have been given: one is preference hedonism (or subjective hedonism), which states that the valuable mental states are those that are, as a matter of fact, desired. As Sidgwick (1962, p. 127) wrote: "I propose therefore to define Pleasure … as a feeling which, when experienced by intelligent beings, is at least implicitly apprehended as desirable, or—in cases of comparison—preferable." The second way in which mental states might be ascribed a value is to propose that some mental states are *objectively* valuable. Objectively valuable mental states are typically said to include fulfilment; calm; peace; hope; *the experience of love and friendship*; happiness; and a sense of achievement. On any plausible hedonistic account of well-being, therefore, love will be high up on the list of valuable mental states. Of course, its value could be offset by disvaluable mental states, such as pain. However, many people would interpret the pain associated with 'true' love as being un-entangleable from its depth, meaning, and value.

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