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To crave is like to be in love[1]

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Abstract

In this article, I show that the experience of addictive desires, which I also refer to as cravings, is similar to the experience of the state of being in love or of *limerence*. In other words, I argue that some part of the experience of addiction resembles some part of the experience of romantic love. Many in the literature have tried to show that one can be addicted to love in the way that love constitutes an addiction. Yet, none seem to have taken the opposite route, which takes love not as an object of addiction, nor as something that can be reduced to it, but rather as a model from which we can understand addiction. This is odd, as such a perspective is warranted by first-person accounts of addiction. Therefore, in my view, *addiction is like love*, and not the other way around. Nevertheless, it is not addiction as a whole that is similar to love; love in itself cannot be compared to addiction: it is precisely the experience of addictive cravings in addiction that is like limerence. In order to put forward the similarities between experiences of cravings and experiences of limerence, I go through the basic components of limerence as described by Dorothy Tennov (1979), and prove that they are found in the experience of cravings. This comparison between the two phenomena allows me to introduce the notion of reciprocation in the addiction literature.

1. Introduction

Interestingly, many recovered addicted individuals refer to their past drug use through the lexicon of love, romance, and relationships. Take for example Caroline Knapp (1999), an American columnist, who titled her now well-known memoir on alcoholism *Drinking: A Love Story*. Similarly, the neuroscientist Judith Grisel talks about her addiction to pot like a loving friendship: "From the first time I got high until long after I'd smoked my last bowl, I loved marijuana like a best friend. This is not hyperbole" (2020, 51). This way of speaking is somewhat puzzling, because love and addiction have, intuitively, opposite valences: on one hand, love is thought to be an overall positive thing; on the other hand, the condition of addiction holds negative value. Yet if recovered addicted individuals intentionally use these terms and explicitly choose to talk about their experience of addiction through the vocabulary of love, we may wonder what it is exactly about addiction that makes it appear similar to love. For example, would it be accurate to say that addicted individuals are *in love* with a substance? Is

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this way of speaking purely metaphorical, or does it rather express a certain truth about the relation held between an addicted person and the object of their addiction?

In this article, I wish to show that the experience of addictive desires is similar to the experience of limerence, of the state of being in love.[2] Many in the literature have tried to show that one can be addicted to love in the way that love constitutes an addiction (Peele and Brodsky 1975; Timmreck 1990; Reynaud et al. 2010; Sussman 2010; Lewis 2015; Fischer et al. 2016, Earp et al. 2017). Yet, none seem to have taken the opposite route, which takes love not as an object of addiction, nor as something that can be reduced to addiction, but rather as a model which we can use, by way of comparison, to understand addiction. In this regard, *addiction is like love*, and not the other way around. Nevertheless, it is not addiction as a whole that is similar to love; love in itself cannot be compared to addiction. Rather, the experience of addictive cravings in addiction is like *limerence*, which is the technical term given to the state of being in love.

In order to put forward these similarities, I will go through the basic components of limerence as described by Dorothy Tennov, the psychologist who coined the term in *Love and Limerence* (1979), and prove that they are found in the experience of cravings. I hope to show with this article that there is something highly interesting to note in the features that cut across both the state of being in love and the state of being addicted through the experience of addictive cravings. Love is a word that has an equivalent in every language, unlike craving or addiction (Hormes and Rozin 2010). It might therefore be more universal and cross-cultural than addiction. If that is the case, then it seems better suited to try to make sense of addiction through what we know of love and relationships, rather than the other way around.

2. What is Limerence?

"Limerence" is a term coined by Dorothy Tennov, as she was trying to differentiate the act of loving and the state of being romantically in love. According to Tennov, the first is something you do, and consequently choose, while the second is a state, a mental activity (1979, 18), and therefore is rather endured and felt. The distinction between the two implies that you can love without being in love, and be in love without loving. Notably, both are components of romantic love. However, the first is a non-necessary component of it, because the phenomenon of romantic love does not require that one *be in love*; one can love romantically without being in love as characterised by limerence[3]. Sexual desire must also be distinguished from love and limerence. Although they are strongly correlated, the three can exist without each other. Another state that limerence must be differentiated from is infatuation. Although Robert Nozick's (1989) description of infatuation[4] seems to fit quite well with Tennov's account of limerence, Lopez-Cantero (2022) argues that infatuation, unlike limerence, is an *unreasonable* state. Because the experience of cravings is one that seems to be typically *arational*,[5] in the sense that it is neither reasonable nor unreasonable, I think it is better suited for comparison with limerence, and not infatuation.

2 I want to stress that the state of being in love and the act of loving are different phenomena. What I compare with the experience of cravings is precisely the experience of *being in love*. One of the differences between being in love and loving is that the first is a state, not an act, and can therefore be (uncontroversially) self-centred and self-interested. This is so because being in love does not require that anyone except oneself be involved in such a state, outside imagination. The fact that being in love and loving are different phenomena seems to be corroborated by first-person testimonies, like in Tennov's work, but also by literature and cinema. Take for example the beginning of the movie *Saltburn*, where the character Oliver narrates the following: "I wasn't in love with him. I know everyone thought I was. But I wasn't. I loved him. Of course!" (Fennell 2023).

3 This is something that Tennov herself recognises.

4 "Infatuation" is a synonym of "being in love" in his book (see Nozick 1989, 70).

5 This is so because cravings do not need to be triggered by (good or bad) reasons. Most often they can be rationalised *a posteriori*, but no reason is needed for them to arise.

Tennov is not alone in thinking that the state of being in love corresponds to what she identifies as limerence. In fact, a study conducted by Lamm and Wiesmann (1997) shows how people's experiences of the state of being in love include many of the characteristics listed by Tennov as basic components of limerence, and which I will explore in section 4, such as "arousal," "attributing positive characteristics to O," and "thinking about O," where O is the object of the love. Moreover, José Ortega y Gasset's description of love's initial stage (before the act of love) seems to correspond closely to what Tennov describes as being in love (1957, 12):

> At its inception love certainly resembles desire, because its object, whether person or thing, excites it. The soul feels agitated, delicately wounded in one spot by a stimulus produced by the object. Such a stimulus has, then, a centripetal direction: it comes to us from the object. But the act of love does not begin until after that excitement, or rather, incitement.

In other words, there is arousal and interest towards the loved object, for Ortega y Gasset, at the inception of love; a pulling effect on attention and perception from the loved object. Such a definition of the phenomenon of love at its start is very similar to limerence. At least, and as we will see in section 4 of this article, both share important common traits.

3. What Is a Craving?

As Weingarten and Elston (1990) describe it, most people have an intuition about the meaning of the word *craving*. Usually, this intuition amounts to the idea that a craving is a subjectively intense desire for something (Kozlowski and Wilkinson 1987; Bruehl et al. 2006).[6] But of course, while many agree on this view,[7] different theories have different explanations of what cravings are and of how they are formed. For example, Dill and Holton (2014) and Henden (2008) build from the theory of incentive sensitisation (Robinson and Berridge 1993) in order to explain the cause of cravings, which they understand to be intense desires to consume certain drugs. For Loewenstein (1999), cravings are not rooted in incentive sensitisation processes, but are rather comparable to visceral factors because of their effect on perception and attention. In this way, cravings are similar to hunger, thirst, or pain, which are motivational and appetitive drives normally essential to our survival. Of course, in the case of addiction, cravings for drugs are not essential for our survival, and for Loewenstein this makes them irrational. Others, like Foddy and Savulescu (2007), take cravings to be part of the larger category of pleasure-oriented desires. Therefore, for these authors, cravings are not pathological and are rather at the extreme end of the continuum of pleasure-oriented desires.

Overall, theories of cravings center around a few questions we may ask ourselves about their characterisation, whether they be food or drug cravings, which are the following: 1) What is a craving? 2) What triggers a craving? 3) What is the relationship between craving and consumption? Type 1 questions want to understand what cravings are, ontologically speaking. Questions about the distinction between cravings and ordinary desires go in this category. Type 2 questions study the cause of the craving in the moment when it is at its full effect. For example, the cause may be internal and rooted in specific brain mechanisms, or it may be external, through the presence of some environmental cues. Type 3 questions are concerned with the relationship

6 The object of the craving is not always the same for different authors. For example, Marlatt (1978) claims that, in the case of alcohol, it is the effects of alcohol rather than the alcohol itself that are desired.

7 If intensity of cravings is usually agreed upon, Sripada (2018) argues that cravings are not really intense, but rather very *frequent* desires to consume, which makes them incredibly hard to resist by the principle of fallibility.

between a craving and the effective act of consumption: is it causal, or simply correlational? Some believe that there is a direct link between craving and consumption and relapses, while others hold that there is no such relation between the two (Tracy 1994).

But there are also Type 4 questions, which are not as present in the literature, and yet are equally as important. These questions focus on the experience one has of a craving. The experience of a craving is not independent of its cause or effects. It is also indirectly related to ontology. Nevertheless, it allows for a different approach in understanding cravings, focused on the moment when they are felt and on the subjective perception one has of them. In this article, I wish to address Type 4 questions and matters of perception and phenomenology. In other words, in order to make a parallel between cravings and limerence, I want to know how cravings are experienced.

In my view, a craving can be characterised through four main features: it is intentional; it is accompanied by a feeling of urgency; it involves mental imagery; it is goal-directed.

The first feature is rather evident: a craving is a craving for *something* (Elster 1999). Usually, this object is specific and determined for the person (alcohol for an alcoholic, cigarettes for a smoker), but the object can be loosely determined, meaning that a *type* of object can be the object of the craving. For example, a person can crave opiates in general, as a type, and therefore want to consume a variety of objects that fall under the type "opiates" (Dhawan et al. 2002).

The second feature[8] highlights the fact that the experience of a craving is one that is intense, almost overwhelming. Urgency happens in two ways: first, a craving person feels that he must attend to his craving *now*; second, there is urgency in the fear of never feeling satisfied and satiated. In other words, urgency is active, in the way that it is action-forward, and it is affective because it also involves a fear of being without the substance, of not having the possibility before one to consume.

The third feature reveals that most experiences of cravings involve mental imagery, so that people experiencing cravings for a certain substance will imagine themselves with the substance or imagine the substance itself in very vivid and visual ways (Salkovskis and Reynolds 1994; Tiffany and Drobes 1990; Andrade et al. 2012).

And finally, the fourth feature addresses the idea that having a craving very often leads to an act. In the case of addiction, this goal-directedness is specifically understood as leading to the act of using drugs. This last feature is explicable by the Elaboration-Intrusion theory of desire (Andrade et al. 2012). If a craving is an intrusive thought which has been elaborated, meaning that plans have been made in order to satisfy the desire, then it seems as if a craving is similar to a goal one wants to achieve.

8 Many quotes from addiction memoirs point towards this idea of the two-fold urgency. Take for example this passage in Caroline Knapp's memoir: "A woman I know named Liz calls alcoholism 'the disease of more,' a reference to the greediness so many of us tend to feel around liquor, the grabbiness, the sense of impending deprivation and the certainty that we'll never have enough. More is always better to an alcoholic; more is necessary" (1999, 57).

4. The Basic Components and the Link with Cravings

In her book, Tennov (1979, 23–24) lists twelve basic components[9] that characterise the state of limerence. In this section, I will go through each of the components, and show that they can be found, in a similar fashion, in descriptions of experiences of cravings in addiction.

a. Intrusive thinking about the object of your passionate desire (the limerent object or "LO"), who is a possible sexual partner.

Tennov stresses that limerence is "first and foremost a condition of cognitive obsession" (1979, 33). In other words, limerence manifests itself predominantly in the way that it interferes with thoughts. The limerent object ("LO") is present in the mind intrusively and persistently when limerence is at its peak intensity. The limerent fantasy is not something that you can control, as it merely happens to you (1979, 40). In this way, it is considered almost inescapable. Tennov cites a person's diary in order to show how the intrusiveness of limerence is experienced: "This obsession has infected my brain. I cannot shake those constantly intruding thoughts of you. Every thought winds back to you no matter how hard I try to direct its course in other directions" (1979, 34). For a limerent person, therefore, everything is intrusively and obsessively reminiscent of the LO, whether it be a thing, a place, a person, or an event.

It appears that this notion of intrusive thinking is also very central in the case of the experience of cravings. In order to understand the link between thought-intrusiveness and cravings, we can refer ourselves to the Elaborated-Intrusion theory first developed by Kavanagh et al. (2005). This theory of desires, which takes cravings to be a specific type of desires in general, holds that a desire is an intrusive thought that eventually turns into a process of cognitive elaboration. An initial intrusive thought can be triggered by cues of various sorts and of internal or external origins. Once an intrusive thought possesses enough affective weight, it can be elaborated, and it is only then that it acquires the status of a desire. The elaboration consists in "planning ways of achieving the desire ('I could buy a coffee'), generating expectancies about satisfying the desire ('I'd be able to concentrate better once I've had a coffee'), and thinking about one's self-efficacy or ability to obtain the desired object or activity ('I've got change for the coffee machine in the lobby')" (Andrade et al. 2012, 130). To put it briefly, a craving is, according to this theory, an *intrusive thought* which holds an affective weight and which becomes a desire through cognitive elaboration.

It should be pointed out here that in limerence Tennov claims that there is something about the *sexual appeal* of LO that fosters being in love and romantic attraction. In fact, in limerence, for an LO to be an intrusive LO, it must be considered as sexually appealing by the person in the limerent state.[10] Of course, in substance addictions, the object of an addiction cannot have such a status. How, then, can we make sense of this part of the first element in the case of the experience of cravings?

There are two possible ways to solve this tension: either we redefine the element of sexual appeal in a way that can be integrated and applied in the case of addiction, or we accept that there is no such element in the case of the experience of cravings and explain how it is not a problem for a comparison. I suggest taking the first path, and therefore redefining the element in a way that maintains what Tennov is trying to explain in the case

9 Tennov does not mention that the elements are necessary and sufficient components of limerence. Therefore, I think it fair to understand them as *prototypical* elements of the experience of limerence. As a consequence, although her account might appear as very normative, it does not actually state strict necessary and sufficient aspects of limerence.

10 Tennov recognises how this element can be absent in limerence, therefore acknowledging the possibility that asexual people experience limerence nevertheless.

of limerence, but which can also be suited for making sense of the experience of cravings. In this way, when Tennov says that for an LO to be an LO he or she needs to be sexually appealing, she really means that for an LO to be an LO he or she needs to be *seen as an object that can be rewarding*. Sex is a natural reward, and so it could be the case that what really influences any romantic pull towards a person in particular is the perception that they can be rewarding, or bring about a reward, in the future. In the specific case of limerence, the reward is taken as something that is attained through sex or through a possible sexual encounter. If this reductionist strategy is correct, then it is arguable that this element is present in the case of addictive cravings too. In fact, for an object to be a craved object (a "CO"), it needs to be seen as an object that can be rewarding or that can eventually bring about a reward. In addiction, the reward will be obtained differently than through a sexual encounter. Nevertheless, the CO, just like the LO, will be perceived as rewarding.

b. Acute longing for reciprocation.

When one is in a state of limerence, one deeply wishes for reciprocation from his LO. One wants to feel loved back and seeks for proof of reciprocation everywhere. The hope that reciprocation is possible and eventually going to happen keeps the person in the romantic state. Tennov cites the experience of a woman named Hilda, which accounts very well for this second element (1979, 60):

> Actually, all the time Stu and I were lovers, it was like that. Even when we were together every week without fail, I'd be consumed with hopes and plans and visions of him really showing love, and he'd always pull something unexpected. If I gave up and planned to break it off, that would be the weekend he'd start off with flowers 'just for my Hilda' and be especially nice. The next week when I'd work myself up to expecting a big response from him, there would be the inevitable letdown.

Hilda's experience of being in love with Stu really highlights the fact that when one is in love, one is consumed with the thought of the other person reciprocating love, presence, and affection. Hilda in this example is, even through adversity and plans gone wrong, lost in her thoughts and fantasies that Stu might, eventually, reciprocate his love for her.

Reciprocation in the case of addiction is, of course, not to be assumed to be reciprocation of *love*. Also, if reciprocation is defined as something necessarily done by an agent, then it cannot be accounted for in substance addiction. Yet, despite these differences, I believe that there is something in the experience of cravings that resembles reciprocation if we define the latter, going back to its Latin etymology, as a movement of back and forth, or more specifically as a kind of giving back, a *return of feelings*.[11] In this way, reciprocation can be understood as having two senses—a strong and a weak sense—which both fall under the description of a "return of feelings." The first and stronger sense is rather intuitive and refers to the type of reciprocation found in experiences of love. The return of feelings here is a mutual exchange of feelings, or a "requitedness" of feelings: when person A reciprocates in love towards person B, it means that A feels the same way towards B that B feels towards A. The second and weaker sense of reciprocation is the one found in experiences of cravings, where the return of feelings is understood as a *going back to*. Of course, exchanging mutual feelings with another agent and going back to feelings obtained from substance use are different in many ways, but the description of reciprocation as a return of feeling unifies both phenomena while keeping their respective connotations. In other words, the definition and description of reciprocation as a return of feelings allows me to compare the two in a valid and fruitful way.

11 See for example the Oxford English Dictionary's fourth entry of "reciprocate" (https://www.oed.com/dictionary/reciprocate_v?tab=meaning_and_use&tl=true; accessed March 27, 2024) or its fifth entry of "reciprocation" (https://www.oed.com/dictionary/reciprocation_n?tab=meaning_and_use#130644449; accessed March 27, 2024).

Reciprocation in addiction is made possible through two elements. First, the substance one is craving and addicted to is not merely stumbled upon. It might be at first, but once it becomes a drug of choice,[12] it is specifically preferred for some of its qualities. For example, one might prefer marijuana precisely *because* it relaxes and calms them. Second, this chosen addictive substance has the capacity to deliver those qualities for which it is overall preferred, and thus of bringing about a rewarding state. Combined, these two elements give rise to the possibility of reciprocation, understood as a return of feelings in its weak sense. In short, consumption of CO can be seen as an act of reciprocation because it can fulfill a need or a desire which it has itself caused; the consumption of a CO, and the effects it can have on one, are the reasons why a CO is a CO.

The importance of and longing for reciprocation in addiction is made clear through testimonies of addiction. For example, Marc Lewis, a neuroscientist and former addict, recalls the following in his *Memoir of an Addicted Brain* (2011, 44):

> I smoked up a few more times during my remaining days in Toronto. I could sit in my parents' home and feel less than humiliated by the stupidity of our dream, less than angry, no longer sad. I could change the way I felt at will. As long as I had my bag and my papers, I was safe from depression, free of the nausea of shame.

In the last sentence of this passage, it is clear that Lewis gets something from the sole thought of having the substance (marijuana) he wants to consume accessible to him. Knowing that he has the bag and the papers gives him the safety that he needs and seeks, because it offers the possibility of a return, of a "going back" to, feelings. This is a type of non-agential reciprocation: the substance reciprocates because it was chosen to fulfill a need it has led to the creation of, and it can and does fulfill the need when consumed.

Lewis's example is one of many, as it seems that the entire theory of self-medication can be explained though the lens of reciprocation in its weak sense. To summarise, the self-medication hypothesis (SMH) considers that addicted individuals use drugs in order to alleviate and soothe a certain state of being. This hypothesis was first articulated by Edward Khantzian (1985), who has more recently co-authored the book *Understanding Addiction as Self-Medication: Finding Hope Behind the Pain* (2008) along with Mark Albanese. There are two conditions to the SMH. First, drugs are addictive because they have the power to diminish or alleviate certain psychological sufferings. Second, people susceptible to developing an addiction usually have difficulty regulating their emotions, self-esteem, interpersonal relationships, and behaviours. These two aspects combined engender the therapeutic consumption of drugs.

If the SMH is true, it seems like addicted individuals have a longing for reciprocation from their CO that resembles what people in the limerent state feel for their LO. In limerence, one longs for reciprocation, for a return of feelings in the strong sense, from an LO. In cravings, one longs for a return of feelings in the weak sense from their CO, as one hopes to fulfill, through consumption of CO, the need that the CO has itself caused.

c. Dependency of mood on LO's actions, or, more accurately, your interpretation of LO's actions with the probability of reciprocation.

When one is in the state of limerence, one's mood is affected and influenced by every action of one's LO, or rather, by the interpretation of the LO's action and whether or not they indicate a sign or a probability of reciprocation. We can take for example one of Tennov's interviewees' statement (1979, 54–55):

12 See for example O'Connor and Berry (1990) on the topic of drug of choice.

> It was just a little thing. Except it wasn't a little thing. She forgot to wear the pin I had given her, even though I had asked her to be sure to wear it. I wouldn't have minded so much if she had been angry and left it home to get even with me over something. But to forget? There's no way I could have forgotten if she had asked me for anything. It meant I wasn't in her thoughts the way she was in mine. I hoped that she was teasing, that she really was mad at me. Anything but forgetting. Being forgotten was like being dead. I wanted to die. I felt it was all over in that second. I prayed for a sign that she was playing with me. She wasn't. It was ended, but it took me about six more months before I could tolerate believing it.

In this quote, the mood of the person in the limerent state is deeply affected by the possibility of being, or not being, loved back ("It meant I wasn't in her thought the way she was in mine"). Once he realises that the possibility that the love he feels for his LO might be unrequited, he panics and even reveals feeling like wanting to die.

As for the experience of cravings, the probability of reciprocation, which is understood as the possibility of CO to (re)deliver the qualities for which it is craved, also greatly impacts the mood of the craving person.

Lewis tells about one time when he was working late in his university laboratory and discovered morphine bottles in the fridge. Although he had not consumed in a while, on this particular evening, he simply could not control his desire, his craving, for the substance. The thought of the drug being there right next to him, as well as the idea that he would eventually, at some point in the evening, consume some, was especially exciting to him. In this passage, it is clear that the possibility of reciprocation from the morphine really changes his mood: "I'm actually humming this as I get up to replace one rat with the next. I'm humming this and I'm smiling a little to myself, smiling with a sneaky little smile, a sneaky little rat smile. A smile for no one. A smile no one can see. But there is a quickening in my pulse. A part of me has given up" (2011, 205). His facial features cannot hide his pleasure, his excitement, that he knows he will be receiving from injecting morphine. In other words, the possibility of a return of feelings from morphine drastically changes his mood in a positive way.

d. Inability to react limerently to more than one person at a time (exceptions occur only when limerence is at low ebb—early on or in the last fading).

According to Tennov, there will usually only be one LO at a time. This means that, in most cases, a person will be in a state of limerence towards only one person at a time. Sometimes, the person in the limerent state will stop being limerent towards LO_1 because they have started being limerent towards LO_2. In this way, Tennov claims that "the pain of one love seemed only to cease with the advent of the next" (1979, 11). In other words, recovering from feeling in love with LO, perhaps unrequitedly, is achieved through being in love with another, new LO.

The inability to react limerently to more than one person at a time seems similar to what, in the literature and in first-person accounts of addiction, amounts to the concept of "drug of choice." Addicted people will prefer a certain substance (Hopwood et al. 2008) and researchers can even guess what type of substance will be preferred by one depending on one's personality. Aside from personality assessments, drugs of choice are also correlated with the type of suffering one is dealing with and wanting to relieve. This is found to be true through the self-medication hypothesis, which I have previously introduced. In other words, there is a specificity to drug use: in most cases, one uses or seeks to use a particular drug or type of drug, not just any drug. This is not to say that one cannot find many substances pleasurable or desirable, but that an addicted person usually finds one substance in particular as more attractive and as more suitable for his wants and

needs. But in any case, the parallel I want to draw between limerence and cravings specifically concerns the moment when one is craving. And in that moment, there usually is only one substance, only one CO, at a time.

To give an example, there is a passage in Knapp's book where she explains how an alcoholic is always drawn to a specific type of alcohol, and yet this relationship is not exclusive. She names this one drink one's *true love*, and it stands besides secondary loves, past loves, and acquaintances, all represented by different alcoholic drinks. Her personal true love was white wine (1999, 105):

> I was a white wine junkie. Toward the end I'd slug down just about anything but if I had my choice, I'd drink a crisp, cold, dry white, a French Sauvignon Blanc or a Chardonnay from the valleys of northern California. The look of a bottle of white wine in a refrigerator always reassured me somehow, the way it stood there on the shelf, beads of moisture forming on the exterior, the labels forming sharp rectangles of color against the pale golden liquid.

For Knapp, white wine was her drug of choice, even though she mentions that she could have ended up drinking just about anything which contained alcohol. Thus, white wine for Knapp was like an LO to a person in the limerence state: replaceable, but still the preferred option until then.

e. Some fleeting and transient relief from unrequited limerent passion through vivid imagination of action by LO that means reciprocation.

In limerence, it is very common for people to have regular fantasies about their LO through their imagination. Usually, the fantasies will be about LO acting as if reciprocating feelings of love. These mental images will also offer some relief and comfort to the person in the limerent state, who will feel like reciprocation is possible and going to happen in a near future. Take for example Larry's limerence towards Evelyn, which involved a lot of mental imagery (Tennov 1979, 37):

> In my mind I was rehearsing the big moment when I'd suggest we have dinner together and imagine these complex situations that would bring it off. Every time I learned something more about her, I'd incorporate that into my daydream. For example, I first thought of, you know, inviting her to my place to listen to jazz records, and we'd be off and running from there. Then I found out she was a classical musical student and I went into this big idea about getting a pair of super concert tickets through my brother-in-law whose uncle plays the oboe in some orchestra.

In short, in this citation, Larry explains how he often daydreamed about Evelyn and used elements that he knew about her to enhance his fantasies and mental representations of her.

It is very interesting to note that in the experience of cravings as well, mental imagery plays a very important, if not foundational, role. In fact, mental imagery often accompanies cravings and intensifies them.[13] Let's take Natalie's case, found in Marc Lewis's second book, *The Biology of Desire*, as an example to understand better how cravings and mental images are entwined (2015, 52–53):

> She'd be at the restaurant, working her shift, actually enjoying the summer sun streaming through the plate-glass windows, when suddenly it would strike. The thought, the image. It might be triggered

13 According to Andrade et al., "while craving can occur without imagery, it is imagery than provides a rich sensory experience that accentuates relief or pleasure and aggravates feelings of deficit" (2012, 130).

> by smoke rising from the cigarette of someone standing just outside the entrance. Or by the peculiar flattening of a spoon sitting next to the dirty plate on a nearby table, calling to mind the misshapen spoon of the dope-shooter, bent so that the bowl remained horizontal when the spoon lay at rest.

In this example, Natalie's desire to consume heroin starts as a thought, an image, that pops up insidiously, or rather intrusively, in her mind. This seems to be the case of most addicted people who experience desires to consume a certain substance. In fact, according to a study led on intrusive thinking and its suppression by Salkovskis and Reynolds, smokers often have intrusive thoughts about smoking. These thoughts are accompanied by vivid images associated with the act of smoking. As mentioned in the study, the most common mental images were the following (1994, 195): "Yourself smoking cigarettes; cigarette packets; other people smoking, enjoying it; borrowing cigarettes; image of yourself in a relaxed place, enjoying a cigarette; someone offering you a cigarette; image of yourself under stress, having a cigarette to help calm down or cope; yourself buying cigarettes." Moreover, it seems that the intensity of cravings and the vividness of mental images are positively correlated. In fact, Tiffany and Drobes (1990) found that, for smokers, the more vivid were the mental images associated with smoking, the more intense were their desires to smoke. If these particular studies only apply to smoking and related mental imagery, similar findings exist in the case of alcohol. Litt and Cooney (1999) have indeed discovered that alcohol cravings can be induced by asking people to "imagine entering their favorite bar, ordering, holding and tasting a cold, refreshing glass of their favourite beer."[14] In other words, it is sufficient, in order to induce cravings of alcohol, to ask people to form mental images of things and scenes related to alcohol consumption.

The link between mental imagery and cravings can be understood through the desire theory of Intrusive-Elaboration (Kavanagh et al. 2005), which I have previously introduced. Briefly, according to this theory, a desire such as a craving is an intrusive thought that can arise spontaneously in a schematic, verbal, or image format, and which has been cognitively elaborated. Therefore, only elaborated intrusive thoughts become desires. Elaboration consists for example of planning the ways in which the desire will be satisfied, of thinking about what the satisfaction of the desire will lead to. The elaboration usually implies mental imagery and fantasising.

It is interesting to note that, for some people, the mental images in and of themselves are more pleasurable than the consumption of the addictive substance. For example, Andrade et al. (2012, 131) mention that one smoker reported how his imagined cigarette was always the best cigarette ever smoked.

f. Fear of rejection and sometimes incapacitating but always unsettling shyness in LO's presence, especially in the beginning and whenever uncertainty strikes.

In the experience of limerence, one is subjected to an intense fear of rejection from his or her LO. This fear of rejection obviously causes pain, but, as Tennov explains, it also enhances desire because it fuels uncertainty. In other words, limerence is sustained by the hope of reciprocation and its uncertainty. This fear produces many different effects on one in the limerent state, such as shyness and self-doubt. It also has physiological consequences associated with fear responses, such as heart palpitations, flushing, and general weakness. Tennov quotes, as one example of many, Philip's experience in order to justify this component (1979, 49):

> I'd be jumpy out of my head. It was like what you might call stage fright, like going up in front of an audience. My hand would be shaking when I rang the doorbell. When I called her on the phone I felt like I could hear the pulse in my temple louder than the ringing of the phone, and I'd get into such a

14 See Andrade et al. 2012, 128.

> panic listening to the ring and expecting Nelly's voice at the other end that I'd have a moment of relief if no one answered. And when she did answer, I wouldn't know what to say even if I'd gone over the whole thing in my head beforehand. And then whatever I did say never seemed to come out right.

Philip is experiencing intense fear of rejection from his LO, Nelly, which leads him to have the symptoms of what he calls stage fright. Philip's experience is typical of people in the limerent state.

In the case of cravings, one does not fear being rejected *per se* by the substance one is addicted to. However, we can reformulate the fear of rejection identified by Tennov in experiences of limerence by holding that it is actually *a fear of being without*. Perhaps rejection and "withoutness" are not the same thing, but it seems that withoutness can explain the fear of rejection. The idea is to say that rejection is experienced as something negative and frightening because it means that one won't be receiving the love that they want from their LO. In other words, rejection is feared *because* it implies withoutness. Reformulating the fear of rejection in such a way allows me to compare it with the fear of non-availability of the substance—of withoutness—that is so common in addiction.

Knapp, in her memoir, explains how she is afraid of being without the substance, always checking that there is alcohol around for different occasions. As she puts it, what drives the constant checking of the presence of alcohol is the fear of being without it: "There's a dark fear to the feeling of wanting that wine, that vodka, that bourbon: a hungry, abiding fear of being without, being exposed, without your armor" (1999, 58). Jowita Bydlowska says something similar in her own memoir: "And there's fear behind the wanting—the fear that if the wanting gets denied there will be only pain and the fear itself left" (2013, 11). In other words, for both women, fear of being without the substance is an inherent part of their craving experiences.

g. Intensification through adversity.

Tennov cites Joan's experience of being in love in order to show how the uncertainty of being loved back, and even potentially rejected, has a surprising effect on the intensity of limerence: "When I was in love with Barry, I was intensely in love. When I felt he loved me, I was intensely in love and deliriously happy; when he seemed rejecting, I was still intensely in love, only miserable beyond words" (1979, 45). This citation shows how adversity and difficulty in reaching the LO can intensify the feeling of being in love with an LO, as well as increase the degree of involvement in limerence (1979, 46). Doubts and uncertainty are food for limerence. The uncertainty does not, however, have to be real, because it is a matter of perception (1979, 56): if one solely perceives that there is uncertainty in whether or not one's LO feels the same towards one, it is enough to feed the intensity of the limerence.

In cravings, the uncertainty of the achievement of the goal, which would be consumption of the CO, also acts as fuel for the desire. In this interesting passage, Lewis explains how his desire for LSD is, in a way, similar to his desire to be with Lisa. Both are, as he writes, magnified by the uncertainty of their obtainment, which can be understood as a manifestation of adversity (2011, 83):

> As with Lisa, the excited craving of something half-attainable was the most potent elixir. It's true: my attitude toward LSD, a drug, was not much different from my zeal to connect with Lisa, a girl, thanks to a flood of dopamine in my ventral striatum—wanting and wanting and wanting and finally getting, magnified by the uncertainty of the goal.

In other words, the uncertainty of achieving whatever is wanted and craved makes the whole experience of wanting even more intense.

A study led by Dunbar et al. (2000) on smokers also showed how cigarette cravings are higher in intensity during abstinence from smoking than during use. This finding suggests that adversity, which in this case is to be understood as the absence of a fulfilled craving, actually enhances the craving.

h. Acute sensitivity to any act or thought of condition that can be interpreted favorably, and an extraordinary ability to devise or invent "reasonable" explanations for how the neutrality that the disinterested observer might see is in fact a sign of hidden passion in the LO.

The component of acute sensitivity in the experience of being in love means to point out how in limerence, any action from an LO will, as much as possible, be interpreted as a positive sign of reciprocation. In her book, Tennov gives the example of Dr. Vesteroy, whose LO at the time was a female colleague. In his testimony, it is very clear how the LO's actions are always interpreted in a way that could indicate reciprocation (1979, 59):

> At first, I'd set up little tests. I'd say that if at the next meeting she elects to sit beside me or facing me, I will count it as proof that this madness is not unilateral. But when she chose a seat farthest from me, or one which made it very difficult for us to look at one another, I realized that the test was not a test at all. No matter what she did, I could interpret it in my favor.

Even when his own tests would fail, Dr. Vesteroy tried to explain his LO's behaviour in a way that did not exclude the possibility of reciprocation from his LO.

In the case of cravings, an addicted person who is craving a certain substance will most likely interpret facts and feelings in a way that makes it likely that the substance and its consumption will bring about the desired rewarding state for which it is craved. In other words, the drug is perceived in favour of its possible reciprocation.

For example, Bill Clegg writes in his addiction memoir how smoking crack helped him deal with the harsh reality that it had itself brought out (2010, 34):

> If anyone had stopped to watch me go to the cash machine and withdraw stacks of bills, several times because of the $200 transaction limit, then head out to an idling van with tinted windows, and return minutes later with bulging pockets, it wouldn't take much imagination to understand what had just transpired. As obvious and sloppy as I know the whole operation is, I know that once I get back to the room and take a big hit off one of the crystal-clear new stems, everything will be okay. That all the grim and alarming truths barking loudly around me will vanish in a blast of smoke.

Moreover, in an earlier passage (2010, 32), he explains how even though he missed two flights and stood up his boyfriend because of his smoking frenzy, he could not have been happier because he had consumed and was feeling high. Clegg's case clearly shows how, in addiction, when one is craving a certain drug, one will interpret and perceive things in a way that will favour its consumption. It is as if nothing else mattered other than using, and thus reciprocation, taken as the possibility of a return of feelings through consumption of the CO.

i. An aching of the "heart" when the uncertainty is strong.
Tennov explains that limerence is located in the heart, rather than in the arms, as when one is feeling affection, or in the genital area as in the feeling of a sexual desire (1979, 64). Therefore, for Tennov, there is a distinction between limerence and other feelings relative to love through the body parts they are associated with. Although this element is interesting because it draws from bodily feelings in order to make sense of an emotional state, it seems like it is not convincing for at least two reasons.

First, purely physiological sensations can be confused with emotions such as love. Karen Jones (2008) presents a case of a woman who believes she is in love with someone because she feels tingly in her stomach. However, it turns out to be a stomach ulcer instead of love. Second, it is not scientifically clear that, if there were to be a physical body part involved in love, it would be the heart specifically. Although it is true that emotions are associated with specific bodily patterns and reactions, a study lead by Nummenmaa et al. (2013) on the bodily maps of emotions shows how an emotion like love is felt throughout the entire body, and not just in the heart. Therefore, because of the lack of empirical data supporting this element, I do not think it should be considered in our comparison between limerence and the experience of cravings.

j. Buoyancy when reciprocation seems evident.
When things are going well for one in the limerent state, such as when reciprocation is thought to take place, one experiences feelings of buoyancy, of floating or of walking on air. Recall for example the way that Joan describes her feelings for Barry: "When I was intensely in love with Barry, I was intensely in love. When I felt he loved me, I was intensely in love and deliriously happy; when he seemed rejecting, I was still intensely in love, only miserable beyond words" (1979, 45). She mentions precisely that when she felt like there was some type of reciprocation, she was, in return, *deliriously* happy.

This feeling of buoyancy is also present in the craving experience for an addicted individual. As a matter of fact, when things are going well and the craving is therefore thought to be satisfiable, the craving individual can feel ecstatic, motivated, and strong. Take for example Bydlowska, who explains in her memoir how the desire driving her to drink made her feel thrilled (2013, 39): "I don't consciously think of dying when I'm drinking. In fact, the desire that I imagine drives my drinking is the desire to live, to live loudly and freely, without any care. I want to jump, want to run, want to want!" Lewis also has a passage where he describes the euphoria he feels when he knows that he will soon be able to consume his drug of choice, heroin (2011, 129): "Elation surged through me: it was really going to happen. Today. Soon." Therefore, if we understand reciprocation as the return of feelings in its weak sense, it is clear that the indication of such reciprocation in the eyes of addicted individuals leads to a feeling of glee. Just like someone in love, someone craving a substance is affected by the thought of reciprocation.

k. A general intensity of feeling that leaves other concerns in the background.
Without a doubt, limerence is considered to be a very intense and overwhelming mental state that affects attention and perception. In fact, when one is limerent, Tennov explains, one is in a condition of "sustained alertness, a heightening of awareness, and an enormous fund of energy to deploy in pursuit of the limerent aim" (1979, 62). Here is a quote from the prologue of her book that illustrates well how one's attention is modified when in the limerent state (1979, xiv):

> Everything reminds me of you. I try to read, but four times on a single page some word begins the lightning chain of associations that summons my mind away from my work, and I must struggle to

> return my attention to the task at hand. Often I give up easily, leave my desk, and throw myself down on my bed, where my body lies still while my imagination constructs long and involved and plausible reasons to believe that you love me.

In this quote, the person in the limerent state is really struggling to remain focused on tasks unrelated to an LO. This is because the intensity of the limerence consumes thoughts and attention processes.

As for the role of cravings on attention and perception, there are numerous examples, either coming from personal stories of addiction or large-scale studies, that show how drugs affect the brain in its mechanisms of perception and attention. To give a first example of a testimony, take this quote from Lewis's book on his experience with addiction: "By ten I say goodnight and shut my door. I haven't shot drugs in a long time, and the anticipation is a fist grabbing me by the collar and pulling me forward through time" (2011, 157). In this passage, Lewis literally writes that the anticipation of using drugs is pulling him forward through time. His perception of time is therefore distorted by the intensity of his craving and by his knowledge that he will soon satisfy his craving. Indeed, his perception is modified by the knowledge that the drug he craves will reciprocate.

There is, moreover, a neuroscientific theory that can explain the effect of wanting on perception and attention. Robinson and Berridge have, in fact, developed the incentive salience theory of addiction, which is now well-known and recognised in the literature on addiction. This theory stipulates that "the defining characteristics of addiction (craving and relapse) are due directly to drug-induced changes in those functions normally subserved by a neural system that undergoes sensitization-related neuroadaptations" (1993, 249). In other words, according to the authors, neuroadaptations in the brain occur because of the chronic consumption of drugs, which can explain why addiction manifests itself through frequent relapses and cravings. The neural system in question controls a precise psychological function, which is called salience attribution in perception and mental representation of stimuli. But as this system is changed through neuroadaptations, due to the consumption of drugs, it becomes hypersensitive in regards to certain stimuli associated with consumption (sights, smells, or any other detail that can be associated with the drug). The salience of these specific stimuli associated with consumption and drugs makes it very hard to control consumption in part by triggering cravings. In short, to go back to the way cravings affect attention and perception, the incentive salience theory helps us to understand that when one is craving a certain substance, one is pulled, in perception and attention, towards stimuli associated with the CO because of the neuroadaptations that have taken place in the salience attribution system. Thus, without a doubt, just like one's attention is significantly altered by limerence, attention and perception are influenced by cravings.

l. A remarkable ability to emphasise what is truly admirable in LO and to avoid dwelling on the negative, even to respond with a compassion for the negative and to render it, emotionally if not perceptually, into another positive attribute.

When one is limerent, everything about one's LO is considered to be a positive trait, and when there is a risk of perceiving something that could be interpreted as a negative trait, or as a less positive one, that risk is avoided. Fred's account in Tennov's book is particularly revealing of this aspect (1979, 98):

> It seems to me that being romantically attracted to Laura means that I am bending my image of her until it is distorted. Things that might produce an unpleasant picture, I simply do not see. When she appears by relatively objective standards, beautiful and capable, I look long and hard. But when she is not at her best, when I catch her face in an unflattering angle, I turn my eyes away.

Fred prefers to look away when he might catch Laura, his LO, in an unfavourable light, because he is so in love with her. In a later passage of his diary, Fred explains how Laura shows no interest in his work in architecture, which points towards the fact that she would not be a viable girlfriend for him to have, but he nevertheless still holds on to his feelings for her and remains in a state of limerence. He even tries to convince himself of the advantage of Laura being uninterested in his work.

In addiction, there are many examples of addicted persons who, while craving to consume a certain substance, suddenly only perceive the good or inoffensive traits of their CO. Take for example this excerpt from Nic Sheff's autobiography on addiction, where he recalls the moment when he is headed to a friend's place to consume some marijuana after a bout of abstinence (2011, 170):

> She leads me down a couple more blocks, and I talk pretty incessantly the whole time, even though my mind is somewhere else entirely. I mean, basically I'm just going over why this is all okay—over and fucking over again. 'Cause, see, the thing is, the reason I got addicted in the first place was because the drugs took my terror and depression away. But now I've finally learned how to love and value myself. I've grown and changed. So there's no reason why drinking or smoking pot should be a problem.

In this passage, Nic explains how he is convincing himself of the harmlessness of drinking or smoking, which is what he is about to do, and more importantly, what he desires to do. In that moment, he is therefore interpreting his attitude and actions in ways that make drug use favourable ("I've finally learned how to love and value myself"). Indeed, and as he puts it, he has grown and changed from his past as a former addict, so he no longer needs to worry about consuming substances like pot or alcohol. In our view, the resemblance between Fred's way of coping with his perception and interpretation of his LO, and of Nic's way of coping with his CO, is, although somewhat uncanny, conspicuous.

5. Conclusion

In this article, I have tried to show how the experience of cravings is like the experience of being in love with someone. Although many comparisons have been made between addiction and love, none have tried to show that it is the processes in addiction which are similar to the ones in love. Indeed, in the past, researchers have taken the opposite route in order to prove how people in love act and react as if they were addicted. Yet addicted individuals themselves use the vocabulary of love and romance in order to describe how it feels to be addicted. Therefore, it seems warranted to think that addiction resembles love. More precisely, and as I have argued in this article, there are reasons to think that some part of the experience of addiction (cravings) is like some part of the experience of love (being in love). Furthermore, this comparison between the two phenomena has allowed me to introduce the notion of reciprocation in the addiction literature. I define reciprocation as the possibility of a return of feelings, where in love it holds a rather strong sense (a mutual exchange of feelings of love) and in addiction a weaker one (a "going back to" feelings). Reciprocation in addiction is enabled through two features: first, a substance is chosen for its rewarding effects and properties; second, a substance, through consumption, can deliver the effects it has been chosen and is craved for, and can therefore keep being rewarding. This concept of reciprocation applied to addiction seems noteworthy because it highlights the fact that a substance can repeatedly satisfy one through consumption, and that it is precisely because of this possibility to repeat satisfaction through consumption that it is craved. A craved object is craved because it has proven to be rewarding for one *and* because it can continue being rewarding. Thus, reciprocation appears timeless, only acquiring temporal properties through the locality

of an act of consumption. Maybe this can help to explain why one finds it so hard to quit: overcoming the longing for reciprocation requires that one overcome the timelessness of the longing for reciprocation. Finally, thinking of the experience of cravings as resembling the experience of being in love accentuates the fact that addiction is, at least in one of its senses, a way of seeing and interpreting the world. Just like one in love is interpreting life's events through the lens of being in love, one who craves an addictive substance is interpreting life's events through the lens of being addicted.

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