

February 2022



This month's Menopause Matters is a surprise. Read on and you will eventually find out how surprises can be good for your brain.

Valentine's Day

The 14th of February has recently come and gone.

Valentine's Day is not a public holiday, but I think it should be.

Of all the days set aside for us to have a day off work, I would like to see the celebration of our most precious relationships up there with the best of them.

I find it somewhat strange to be given a holiday to mark religious, political, or historical events. Few of us are deeply moved to pay our respects to the named days when cards and presents are exchanged and the commercialisation market seems exploitive. Mother's Day and Father's Day - yes, but the others - no.

Valentine's Day. The reason I think Saint Valentine's Day should be given more credit is that **relationships are the most important thing in the world.**

How we relate to those we choose to love and admire deserves our attention. They are the ones with whom we spend the most time, devote the most energy, and from whom we get the most support. That support is practical, moral, financial, or spiritual. They are the ones we most care about and most care about us.

The commitment vows - either legal or tacit - are personal - and don't rise to the level of national holidays - or maybe they should be. Maybe we should be given one optional day off per year to dwell on our beloved. Tell the boss "I am choosing a particular day to be my and my partner's day off." Take away Freedom Day or Heritage Day and give us our own day or, simplest of all, make 14th February the day when you honour the most important friend you have.

Valentine's Day is the Day of Love

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Love, in any language, is a complex subject - ranging from love of your country, community, group, religious occasions, family, friends, pets, music, hobbies, work, concepts, principles, and nature.

But Valentine's Day should be when we refocus on the one we love.

We should restate our love for our chosen partner, and they should restate their love for us.

Both should articulate the most fundamental concept in interpersonal love - that it goes both ways.

In both romantic and mature love, it has to go both ways.

It is for psychologists to explain how this interaction works - the giving and receiving, but I wish to concentrate on the physiology of love and how science is starting to explain how we "fall in love".

To understand how anyone can be "in love" we need to explore how addiction works in our brains.

Addiction as a brain disorder

There are many examples in medicine where we have found out about physiological processes by studying related pathological processes. A great deal of what we know about the brain's reward centre has been derived from learning about addiction.

The most commonly accepted model of addiction is that it involves the chronic dysfunction of a normal brain process. This process is the stimulation of the reward centre, called the nucleus accumbens, which is situated just below the cerebral cortex. What stimulates the reward centre is usually a pleasurable experience that makes the person feel good, satisfied or pleased with their situation.

The stimulus is not necessarily a substance but can be a behaviour that satisfies some desire but, no matter the source, the result is the same - the reward centre reacts by releasing dopamine.

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Other hormones act in concert namely nor-adrenaline and oxytocin to affect the brain's function to evoke feelings of elated mood, sharpened senses and the relief of tension. These states of mind are described as being alive, focussed, turned on, in the zone or connected and these feelings are attributed to the stimulus.

The *stimulus - hormone production - sensation sequence* is normally processed through the cerebral cortex which modulates one's reaction so that learning about what is taking place occurs. This learning is critical if one wants to repeat the experience; for example, tasting a particular food or relieving pain or releasing tension. So, there is a cognitive component to the *learning/deciding/planning* which prevents illogical or risky actions. If it were not for this modulation, uncontrolled repetition of the stimulus may be indiscriminately sought and used.

Problems can arise when the stimulus is recurrent (voluntarily or involuntarily), and the cortex has to deal with repeated pleasurable or relief-providing situations that cause dopamine release.

The brain quickly learns that the stimulus /dopamine reaction is predictable, even by cues, and starts to anticipate events. Think, for example, of how your dog reacts when you open the cupboard where you keep your walking shoes.

Instead of a rational thoughtful sequence, a short circuit is created where a trigger is learnt for the stimulus and that is sufficient to want the reward centre's dopamine rush. The brain's abnormal chemical pathways now lack the cortical restraint to consider the consequences of achieving the stimulus and controls are lost. It is no longer a question of "lack of will-power", the rational pathways are not in action and the addict cannot help herself or himself and has "diminished responsibility".

All addictions follow this common model of stimulus/abnormal pathway/reward centre/hormone release. The attraction of this model is that:-

- health professionals and the public have an evidence-based explanation for a complex disorder - it provides a basis for the diagnosis of addiction
- by providing evidence for a pathological process, the addict is not seen as weak-willed or morally reprehensible but as a patient with a disorder
- blame is not apportioned and punishment is no longer an appropriate response to addiction
- it can be a relief for an addict to know they have been diagnosed as having "a disorder" and they are one of a group of patients with similar pathology

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- they may feel more willing to seek medical help
- it offers clear lines for management and research

However, the brain disorder model has limitations, especially from the addict's perspective:-

- the model of disordered circuitry does not explain aetiology or propensity, nor does it account for social or environmental influences
- by being classified as having a chronic mental disorder, the addict may feel "pigeon-holed" and see the future as bleak and their chances of recovering as remote
- the brain disorder model may make addicts feel less able to help themselves and therefore take less responsibility for their predicament
- a mentally ill diagnosis may be stigmatising
- a medical condition can lead to increased reliance on medical cures
- the "medical disorder" model narrows management horizons

An alternative explanation is proposed by Lewis¹ who suggests that addiction is a disadvantageous form of learning. He believes that cognitive activity (which includes learning) results from repeated feedback between the organism and the environment in a meaningful manner. He argues that learning becomes pathological when high-reward situations are changed from choices to automatic responses that lack controls by the higher brain centres. In this skewed type of learning, long-term considerations seem less valued and the capacity to override impulsive choices is diminished or lost.

The disrupted learning model explains addiction as a pathological form of learning where the control of reward processing is indeed lessened, but not as an exclusive result of anatomical and physiological brain changes.

The learning model allows addicts freedom from despair. It offers a different option to "I can never recover because my problem is structural" or that recovery is beyond their efforts. They still "own" the problem rather than seeing addiction as permanent and insoluble. It allows addicts to feel improvements can be achieved by their will to change. It moves the responsibility away from medication therapy towards psychotherapy, counselling and cognitive behavioural strategies.

The more balanced abnormal learning model of addiction recognises that the person is connected to their environment at every level. The connection

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influences their perception, their cognition and their behaviour in an interactive "open system" manner.

My view is that the brain disorder model has resulted in a much more humane attitude toward addicts and their predicament. As a doctor the model offers me some understanding of the pathology, however imperfect, and guides direction for interventions and study.

My take is that the learning model expands on the brain disorder model so I can summarise as follows:

- Addiction - be it substance or behaviour-driven - is linked to reward.
- In the brain disorder model, the process of logic and awareness of the harms of the addiction become dampened or "short circuited" with abnormal connections.
- These new pathways result in automated responses where cues, triggers or urges are obeyed without modulation by other parts of the brain.
- Why this happens is unclear but some people are more at risk than others.
- Vulnerability may stem from genetic predisposition and neuropsychological insults or disrupted social interactions.
- The person's behavioural repertoire, their environment and their brain - all at the same time - dictate addiction and must be addressed simultaneously in finding solutions.

What are addictive stimuli?

The list of addictions is extensive with the last being the most mysterious!

Substances - alcohol, nicotine, cannabis or marijuana, opioids, cocaine, fentanyl, analgesics, sleeping tablets, uppers, downers, hallucinogens, food, sweetened drinks, glue etc.

Behaviours - eating disorders, work, social media, games, shopping or shop-lifting, wealth, power, sex, dominance, gambling, peeping, porn, cleaning, obsessive traits, adrenaline junkies, attention seekers, hypochondriacs, exercise addicts and the most beguiling, romantic love.

Is being "in love" an example of addiction?

Let us take that sweet, dizzy love between a couple who "fall in love", who are smitten and "only have eyes for each other". They are "hopelessly in love" and are

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preoccupied with each other, they can think of little else, talk incessantly of their happiness and fantasise about their future together - "forever".

They are "in love" as opposed to sharing mature love where couples form an attachment and are devoted to each other.

The best definition of love I know is:

People giving and receiving in a way that they extend themselves for each other's wellbeing.

The combination of dopamine and nor-adrenaline work to ensure the following actions

- Your beloved is remembered and good results of being together are accentuated
- Giving each other the pleasure of your company creates a cycle of giving more; getting more
- "Love is a mutual giving and receiving of something wonderful"²
- The lovers wish to repeat the experience - a learnt response - and crave to connect again

The brain of a person in love is rewired in the same way as that of an addict, but the stimulus is not a substance or a behaviour, it is their beloved.

Anyone who has ever "been in love" would not trade the feeling for the world because their brains are awash with a chemical storm of well-being hormones, but there are downsides created by this total immersion of being a couple - the downsides of any addiction.

For example

- Romantic love is enjoyable company taken to an intimacy that is exceptional and exceeds the normal patterns of friendship. They start focussing entirely on each other. Friends and family are not attended to, and obligations set aside "for the beloved" with planning and dreams that are beyond reality.
- The lover does not seriously "think through" the consequences of the repetitive actions that they follow and are immune to any detractors telling to "go slow" or take advice that may stop the heady rush they are enjoying.
- Triggers, such as melodies, scenes of beauty, "special tastes" or moments become cues for more of the same. The reward centre is "Pavlovianly" set

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off, almost at a compulsive level and they are literally “love-sick”

- Any imperfections in the other are explained away or relegated to “soluble by love” status – no matter how incongruous or ill-fitting
- Judgements are not made logically
- Gifts may be inappropriately generous.

Fortunately, romantic love quite often results in suitable coupling and both are indeed “made for each other” or are sufficiently smart to make a go of their “precipitated” union. The cynical amongst us may suggest that romantic love addiction is nature’s way of tricking us into procreation!

What’s next?

What happens when romantic love comes to an end?

When the dopamine stops pumping out?

We all know that after two years a reality check starts.

You see your partner for what they are, a fellow human with gifts and faults.

If you are lucky and you have chosen a partner with whom you really connect, and you go on feeling rewarded by their presence. Not in an all-consuming devouring way, but in a comfortable attachment – a feeling that your beloved can be trusted and relied upon. You feel positive about their presence and your brain releases oxytocin. You feel an attachment to each other – a chemical bonding through oxytocin, both when you are together and when you think of each other. It is also the hormone which is plentiful in wedding guests.

The other thing that happens is a type of mutual support. You value them and they value you and your brain recognises this bond – a type of brain-bonding. This is the bond that lasts after the departure of a partner and is so difficult to accept.

So what if we know about brain chemistry?

How does this knowledge of brain chemistry help us in relationships?

Firstly, have you been lucky enough in your life to be generous?

Have you been blessed with enough brains to cope, enough education to question and understand, a “good enough” partner who probably thinks they give more to you than they get from you?

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If so, cherish your partner once a year with something generous - maybe just telling them that you love them, once a year at least. We now know it will reinforce bonding.

Secondly, use your "brain machinery" in a positive way. Like all functions, the more something is used in our bodies, the more efficient it becomes - and the opposite which is called disuse atrophy.

We know what produces the good hormones in our brains. The times when we are excited, **surprised**, challenged and really interested in our surroundings.

It also happens when we feel we have done something good, or been kind or sympathetic or generous. A small encouragement to someone who is struggling. An action for which **you** reward **yourself**.

"Live a life full of vitality, full of interesting and surprising things, and be a positive, loving, generous person. And when love comes your way, you'll be fully ready to respond to it."²

Athol Kent

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References

1. [Lewis](#) *NEJM* 2018;379:1551-60
2. [Merzenich](#) *Medscape* 2022

This has been a personal meander but if you are interested in a more professional approach, go to <https://www.brainhq.com/>

Menopause Matters is usually a monthly review of matters menopausal that have recently appeared in the journals. It is produced for the South African Menopause Society and the summaries concentrate on clinical issues although some underlying patho-physiology will be included to ensure a scientific basis for the work. These summaries and opinions do not necessarily reflect the views of the S A Menopause Society. Any clinical decisions made on the data presented are at the reader's discretion.

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