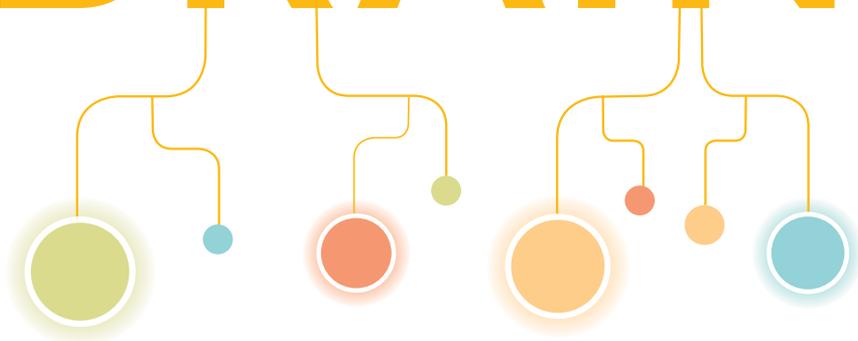


HABITS OF A HAPPY BRAIN



Retrain Your Brain to Boost Your

Serotonin, Dopamine, Oxytocin,

& Endorphin Levels

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Modern society is not the cause of vicious cycles. Our ancestors had variations of their own. For example, they made human sacrifices to relieve threatened feelings, and when they felt bad again, they made more sacrifices. We have developed better ways to feel good, but side effects still plague us, so we strive to do better.

What about Love?

You've probably heard that love is the key to happiness, but it's useful to know how happy chemicals create that feeling. Love is a huge surge of happy chemicals because it's hugely relevant to the survival of your genes. You're not thinking about your genes when you're in love, but your genes are inherited from people who did what it took to reproduce successfully. Brains that motivate reproductive behavior end up making more copies of themselves. Sex is only a small part of the story. Everything from competing for healthy mates to nurturing healthy offspring is relevant to what biologists call "reproductive success." Love motivates all of these behaviors.

You may find it hard to link your loving feelings to natural selection. But in the animal world, it's easy to see how brain chemicals shape mating behavior. The mammal brain is very focused on reproductive success. Once a mammal's immediate survival needs are met, its thoughts turn to the survival of its genes. Animals are surprisingly picky about their mates. For example, every species avoids in-breeding in one way or another. Without conscious concern for genes, neurochemicals motivate alternative choices. Brains that produced in-breeders died out, while brains that motivated alternative mating choices flourished.

Love Is a Cocktail of Brain Chemicals

Each happy chemical rewards love in a different way. The familiar joys and sorrows of love are curiously equivalent to the

impulses of dopamine, oxytocin, serotonin, endorphin, and cortisol. (The sex hormones, like testosterone and estrogen, are central to the feelings we associate with love, but they are outside the scope of this book because they do not trigger the feeling of happiness. They mediate specific physical responses instead.)

Dopamine

Dopamine is stimulated by the “chase” aspect of love. It’s also triggered in a baby who hears his mother’s footsteps. Dopamine is the brain’s signal that a need is about to be met. Female chimpanzees are known to be partial to males who share their meat after a hunt. Protein is scarce in the rainforest and females need a lot of it for gestation and lactation, so meat is a great dopamine stimulator. For humans, finding “the One” makes you high on dopamine. However you define what you seek, dopamine excites you when you approach it.

Oxytocin

Oxytocin is stimulated by touch and by trust. In animals, touch and trust go together. Apes only allow trusted companions to touch them because they know from experience that violence can erupt in an instant. In humans, everything from holding hands to feeling supported triggers oxytocin. Orgasm does too. Sex triggers a lot of oxytocin at once, yielding a lot of social trust for a very short time. Holding hands stimulates a small amount of oxytocin, but when repeated over time, as in the case of an elderly couple, it builds up a circuit that easily triggers social trust. Childbirth triggers a huge oxytocin spurt in mammals, both mother and child. Nurturing other people’s children can stimulate it too. Friendship bonds stimulate oxytocin, and they also promote reproductive success. Monkeys and apes with more social alliances have more surviving offspring, and adolescents clearly desire individuals with more social alliances too. Oxytocin

is related to love in so many ways that it is often called the bonding hormone or the cuddle chemical.

Serotonin

Serotonin is stimulated by the status aspect of love—the pride of associating with a person of a certain stature. You may hate thinking of your love in this way, but you can easily see it in others. Animals with higher status in their social groups have more reproductive success, and natural selection built a brain that rewards you with the good feeling of serotonin when you raise your status. This may be hard to believe, but research on a huge range of species shows tremendous energy invested in the pursuit of status. Social dominance leads to more mating opportunity and more surviving offspring—and it feels good. We no longer try to survive by having as many offspring as possible, but when you receive the affection of someone you perceive as important, your serotonin surges.

Endorphin

Endorphin is stimulated by physical pain, but you get a bit from laughing and crying too. Lovers are known for laughing together, and it's interesting to know that they are stimulating each other's endorphin. Crying is associated with love too, alas. Confusing love and pain is a bad survival strategy, but endorphin pathways may explain some people's tolerance for painful relationships.

Cortisol

Cortisol plays an important role in reproductive success, too. It makes you feel bad when you lose love, which promotes survival by helping you move on. If you remained attached to a person who is not available to you, your genes would be doomed. Cortisol helps your brain rewire to associate your old

lover with negative rather than positive expectations, so you start seeking love elsewhere. We wish lost love wouldn't feel so bad, but it's interesting to know that the bad feeling has a valuable function.

In animals, it's easy to see how bad feelings promote love:

- Cortisol motivates a mammal mama to guard her child constantly and to search for nourishment to sustain her milk.
- Cortisol motivates a male mammal to avoid conflicts he's likely to lose and to risk conflicts he's likely to win. If your social standing is threatened, cortisol alarms you because lost status threatens your DNA in the state of nature.

The Ups and Downs of Love and Survival

Love feels bad for a subtle reason that's widely overlooked. We are born helpless and need love to survive. The first experience in each brain is the sensation of needs that you cannot meet for yourself. You feel good when others meet your needs, and you come to expect that. Alas, we must transition from childlike dependence to mature independence. That can feel like a survival threat to the part of your brain that expects to be taken care of. This motivates people to find adult love, and that keeps our genes alive. But the interdependence of mature love never measures up to the dependence of your brain's first circuits.

Love feels good because it's hard to keep your DNA alive in the state of nature. Survival rates are low and mating opportunities are harder to come by than you might expect. Without a huge effort, your genes would get wiped off the face of the earth. Now, I know you are not thinking about your genes, and animals aren't either. But every brain is inherited from individuals who did what it took to reproduce. Love makes it feel good.

There is no free love in nature. Every species has preliminary qualifying events before mating. Creatures work hard for any

mating opportunity that comes their way. Good feelings reward you for pursuing the quest. Bad feelings warn you that your genes will be annihilated if you don't get busy. Something as small as failing to get a smile from the person you smile at can trigger surprising neurochemistry because your brain relates it to the survival prospects of your genes.

In modern times, people want romantic love throughout their lives, but expectations were different in the past. Children started coming as soon as you had sex, and they cried if you didn't keep feeding them. You were too busy to worry about romantic love. If you lived to middle age, you had grandchildren with more needs. People had the same basic neurochemistry, but without birth control they were more focused on immediate survival. Today, we explore many ways to trigger happy chemicals, but you must keep working to keep them coming. Each burst of a happy chemical is metabolized in a short time so you're always looking for ways to get more. Maybe that's why love songs are always popular. They stimulate brain chemicals without the messy side effects.

And now let's meet those happy chemicals in more detail.

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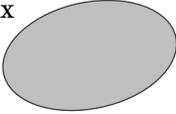
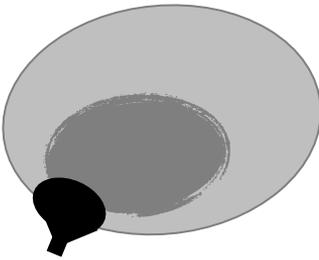
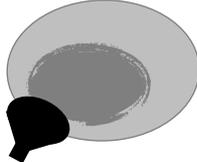
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Comparing brain parts	
cortex 	extra neurons that store life experience by growing and interconnecting
limbic system 	structures that manage neuro-chemicals, such as the amygdala, hippocampus, hypothalamus
reptilian brain 	the cerebellum and brain stem (medulla oblongata and pons), which manage routine bodily functions
human 	
chimpanzee 	
gazelle 	
mouse 	
lizard 	