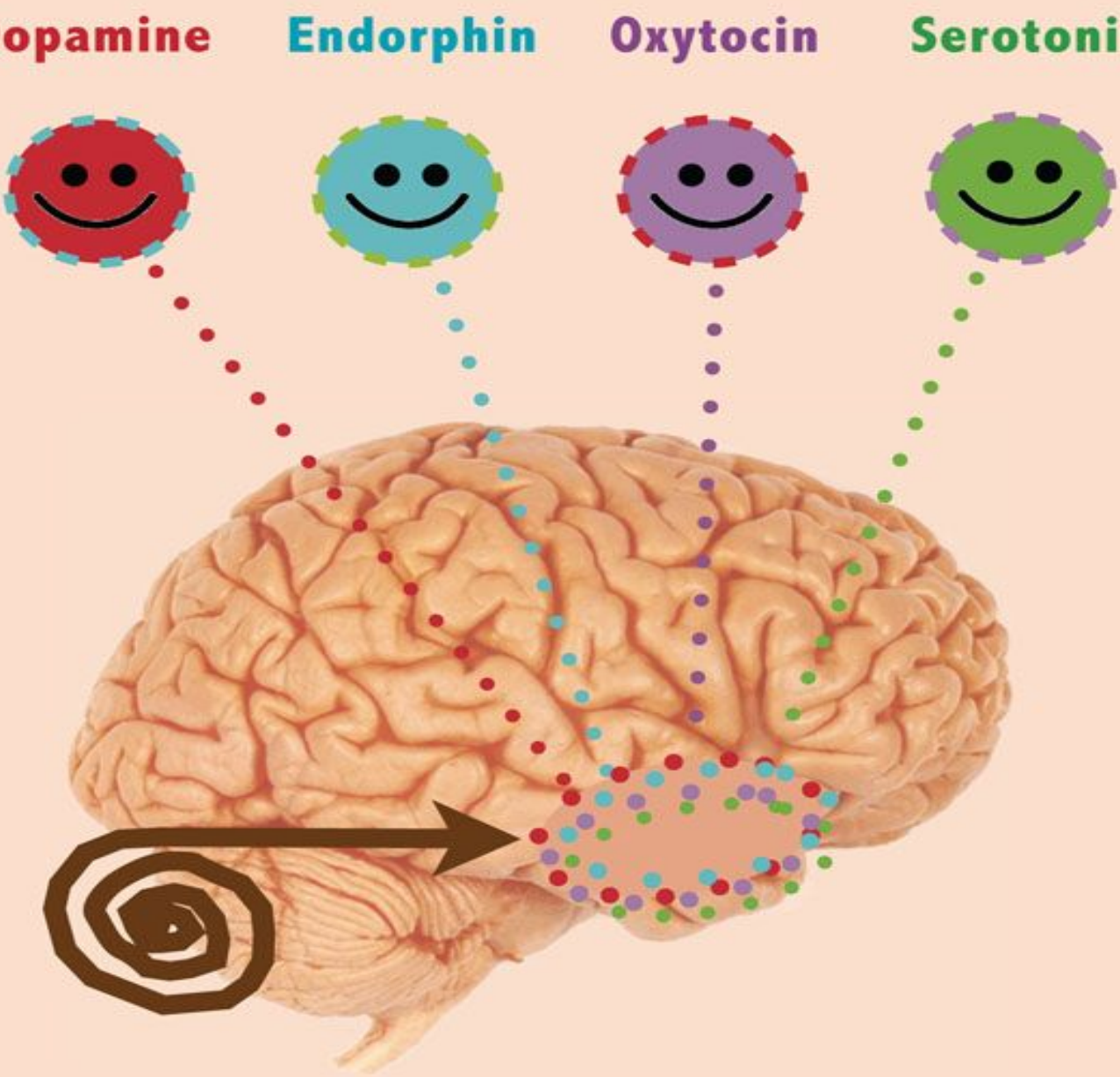
Meet Your Happy Chemicals



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third edition
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Introduction

Happy Chemicals Turn Off So They Can Turn On

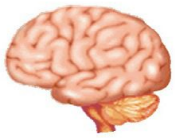
The feeling we call "happiness" comes from four special brain chemicals: *dopamine, endorphin, oxytocin* and *serotonin*. These "happy chemicals" spurt when your brain sees something good for your survival. Then they turn off, so they're ready to spurt again when something good crosses your path.

Each happy chemical triggers a different good feeling. Dopamine produces the joy of finding what you seek–the "Eureka! I got it!" feeling. Endorphin produces the oblivion that masks pain– often called "euphoria." Oxytocin produces the feeling of being safe with others– now called "bonding." And serotonin produces the feeling of being respected by others–"pride."

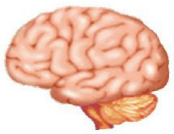
"I don't see happiness this way," you may say. You don't think this in words because neurochemicals work without words. But you can easily see these motivations in your fellow man. And research shows that animals have these same basic neurochemicals doing the same basic jobs. As for yourself, it's easy to believe that your verbal inner voice is your whole thought process, and ignore your neurochemical self.

Happy chemicals are controlled by tiny brain structures that all mammals have in common: the hippocampus, amygdala, pituitary, hypothalamus, and other parts collectively known as the **limbic system.** In humans, the limbic system is surrounded by a huge cortex. These two different brain systems are always working together, trying to keep you alive and keep your DNA alive. Each has its special job. Your cortex looks for patterns in the present that match patterns you stored in the past. Your

limbic system releases neurochemicals that tell your body "*this is good for you, go toward it*," and "*this is bad for you, avoid it*." Your body doesn't always act on these messages because your cortex can override them. Then, your limbic system tries again. The cortex can over-ride the limbic system momentarily, but your mammal brain is the core of who you are.

Four happy chemicals	
dopamine	the joy of finding what you seek
endorphin	the oblivion that masks pain
oxytocin	the safety of social bonds
serotonin	the security of social dominance

Your brain rewards you with good feelings when you do something good for your survival. Each of the happy chemicals motivates a different type of survival behavior. Dopamine motivates you to get what you need, even when it takes lots of effort. Endorphin motivates you to ignore pain so you can escape from harm when you're injured. Oxytocin motivates you to trust others, to find safety in companionship. And serotonin motivates you to get respect, which expands your mating opportunities and protects your offspring.

Happy survival motives	
dopamine	keep seeking rewards
endorphin	ignore physical pain
oxytocin	build social alliances
serotonin	get respect from others

The mammal brain motivates a body to go toward things that trigger happy chemicals, and avoid things that trigger unhappy chemicals. You can restrain yourself from acting on a neurochemical impulse, but then your brain generates another impulse. You are always using neurochemicals to decide what is good for you and what to avoid. Your cortex helps by directing attention and sifting information, but your limbic brain sparks the action.

We struggle to make sense of our neurochemical ups and downs because they don't come from verbal logic. They come from the operating system we've inherited from our ancestors. Once you know how the mammal brain works, your neurochemical ups and downs are easier to accept.

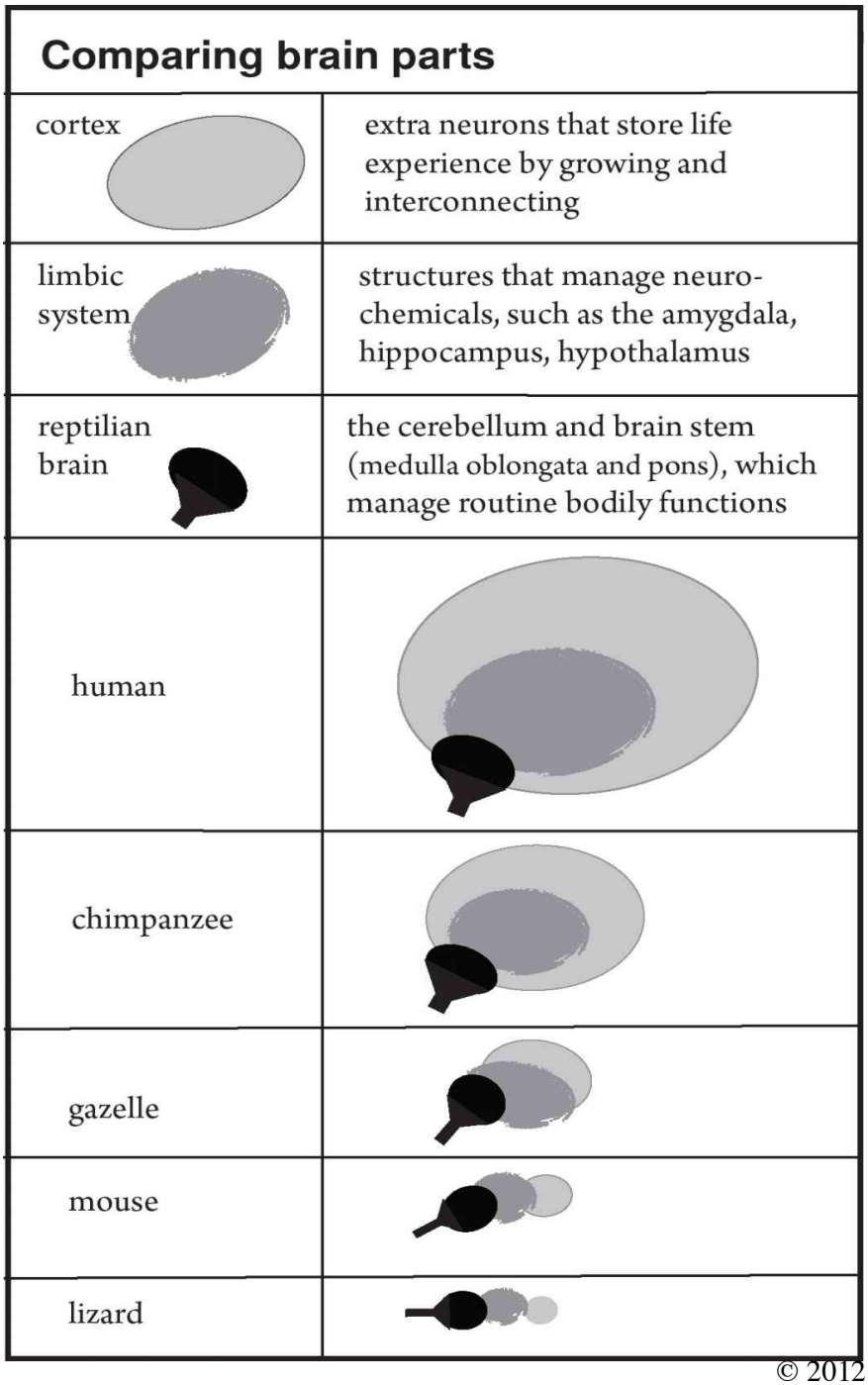
Happy chemicals did not evolve to be on all the time. They evolved to promote your survival. It may not seem that way because the mammal brain defines survival its own way. It relies on early experience, even though children can't understand survival realistically. And it cares as much for the survival of your genes as it does for your body.

This quirky brain complicates the business of being human. We have no choice but to work with the brain we've got. If you know how it works, you can get more happy chemicals from it, and avoid more unhappy chemicals.

It's foolish to think of your cortex as the good guy and your limbic system as the bad guy. You need both to make sense of the world around you. Your cortex sees the world as a chaos of detail until your limbic

system labels things as good for you or bad for you. More important, your cortex cannot produce happy chemicals. If you want to be happy, you have to get it from your limbic system.

But your cortex and your limbic system are literally not on speaking terms. That's because the limbic system can't process language. When you talk to yourself, it's all in your cortex. The limbic system never tells you in words why it is spurting a happy or unhappy chemical. Animals accept their neurochemical impulses without expecting a verbal rationale. That's why animals can help us make sense of our own brain chemicals. The goal here is not to glorify animals or primitive impulses. The goal is to understand our neurochemical ups and downs.



A hungry lion is happy when he sees prey.[1] It's not philosophical happiness. His happy chemicals cause a state of arousal that releases energy for the hunt. Lions often fail in their hunts, and they choose their targets carefully to avoid running out of energy before they get to eat.

So a lion is thrilled when he sees a gazelle close at hand. His dopamine surges, which revs up his motor to pounce.

A thirsty elephant is happy when he finds water. The good feeling of quenching his thirst triggers dopamine, which makes permanent connections in his neurons. That helps him find water again in the future. He need not "try" to learn where water is. Dopamine simply paves a neural pathway. The next time he sees any sign of a water hole, electricity zips down the path to his happy chemicals. The good feeling tells him "here is what you need." Without effort or intent, happy chemicals promote survival.

But happy chemicals don't flow constantly. The lion only gets more happy chemicals when he finds more prey, and the elephant only spurts when he meets a survival need. In nature, there is no free happy chemical. Good feelings evolved because they get us to keep doing things that promote survival.

Your Happy Trails

Your feelings are unique. You have unique ways to turn on your happy chemicals because you built neural pathways from your unique life experience. When something made you feel good as a child, the happy chemicals built connections.When something felt bad, your unhappy chemicals seared that information, too. Over time, some of your neural pathways developed into superhighways because you activated them a lot. The survival system you ended up with is not what you'd design today if you started from scratch. It's the survival system that emerged from real experience.

Your existing neural highway system makes it easy for you to like some things and dislike other things. Often, we find ourselves liking things that are not especially good for us, and fearing things that are good for us. Why would a brain that evolved for survival build such quirky pathways?

Because the brain builds on the pathways it already has. We evolved to store experience, not to delete it. Most of the time, experience holds important lessons. It helps us go toward things that helped us in the past and avoid things that endangered us. But a huge surge of happy chemical builds a huge pathway, even if too much of a good thing can hurt

you. A big surge of unhappy chemical builds a big circuit that lasts even when the threat is gone. This promotes survival in a world where good things are scarce, and threats are enduring. Your brain relies on its pathways as if your life depended on it because in the state of nature, it does.

You built circuits effortlessly when you were young. Building new circuits in adulthood is like trying to slash a new trail through dense rainforest. Every step requires a huge effort, and the new trail disappears into the undergrowth if you don't use it again soon. Such trail-blazing feels inefficient and downright unsafe when a nice superhighway is nearby. That's why people tend to stick with the pathways they have.

You can build new trails through your jungle of neurons, which can turn on your happy chemicals in new ways. It's harder than you'd expect, but it's easier when you know your equipment.

The electricity in your brain flows like water. It finds the path of least resistance. Electricity doesn't flow easily along neurons you've never activated before. Each time a neural pathway is activated, electricity flows more easily. Repetition develops a neural trail slowly, the way a dirt path hardens from years of use. But neurochemicals develop a neural trail instantly, the way asphalt paves a dirt road. Your neural network grew from things you experienced repeatedly and things you experience neurochemically.

Once you've built highways to your happy chemicals, you use them, because it feels like you're promoting survival. New highways are hard to build in later life. You can always add new leaves to your neural branches, but it's harder to add new roots. It's possible, but it doesn't happen in the effortless way it did in youth. You have to spend a lot of time choosing the experiences you feed to your brain. No one can build new pathways for you, and you cannot build them for someone else. But this book will help by showing just what stimulates happy chemicals and what connects neurons. It can be your guide as you work to slash new roads and avoid old ones.

This brain we've inherited is frustrating. In its quest for survival, it often turns unhappy chemicals on and happy chemicals off. When my neurochemistry frustrates me, I remind myself that it has succeeded at promoting survival for millions of years.

The Vicious Cycle of Happy Chemicals

When your unhappy chemicals flow, you don't usually respond by thanking them for promoting your survival. Instead, you focus on ways to trigger happy chemicals. For example, when hunger triggers a bad feeling, a mammal seeks food. When cold triggers a bad feeling, a mammal seeks warmth. Just finding food and warmth triggers happy chemicals, before you actually eat or warm up. Happy chemicals flow when you see a way to meet your needs.

The human cortex is good at avoiding bad feelings. We avoid hunger and chill by planting food and stocking fuel. But unhappy chemicals remain, no matter how well we meet our needs. As soon as you're warm and fed, your brain scan for other things that can hurt you. Your survival is threatened as long as you're alive, and your brain never stops looking for survival threats.

A mammal must take risks to get its needs met. It risks getting killed by a predator while foraging for food. It risks social conflict when seeking mates. It risks losing its offspring before grandchildren have been produced to preserve its genes. Unhappy chemicals are the brain's way of alerting us to such risks.

Unhappy chemicals feel bad because that works. It gets your attention, fast. It's comforting to know that bad feelings have a purpose. When a hungry gazelle smells a lion, bad feelings motivate it to run rather than keep eating. The gazelle survives because the smell of a lion triggers a feeling that's much worse than ordinary hunger. Once the gazelle escapes from the lion, the bad feeling of hunger gets its attention again, and it looks for a safe place to forage. We are alive today because unhappy chemicals got our ancestors' attention to one survival threat after another.

Bad feelings are produced by *cortisol*. Your response to cortisol depends on what it's paired with, be it low blood sugar, the scent of a predator, social exclusion, or myriad other danger signals. When your cortisol flows, it links the neurons active in your brain at that moment. This wires you to recognize those danger cues in the future. A young gazelle has cortisol spurts while following its mother, and the pathways it builds prepare it to survive when its mother is gone. Survival knowledge builds without effort or intent because neurochemicals pave pathways.

When you feel a cortisol alert, your brain looks for a way to make it stop. Sometimes the solution is obvious, like pulling your hand off

a hot stove. But bad feelings don't always have obvious causes. And they don't always have obvious cures. Such feelings keep commanding your attention with the sense that you must "do something." Your brain keeps scanning the world for a way to make bad feelings stop.

That "do something" feeling promotes survival, but it also causes trouble. It motivates us to do anything that stops the cortisol. Can eating a donut fix a career or romantic setback? From your brain's perspective, it can. Consciously, you know the donut doesn't solve the problem. But when something changes unhappy chemicals to happy chemicals, your brain learns from the experience. When donuts trigger happy chemicals (because fat and sugar are scarce in nature), a neural pathway is paved. The next time you have that "do something" feeling, this pathway is one "something" you "know." You may not act on it, because you also know the consequences, and you've built other "do something" pathways. But it remains in your mammal brain's arsenal of survival strategies.

Cortisol is triggered by disappointment. Your mammal brain alerts you when your expectations are not met. That "do something!" feeling gets your attention as long as expectations of romance or success are disappointed, and your brain responds with the strategies it has learned.

We evolved to learn from experience. It might seem that people don't learn from experience until you look at it neurochemically. Neurochemicals are molecules that make physical changes in the brain. These changes help you navigate through the world by triggering good or bad feelings when something felt good or bad in your past. This promotes survival when things that trigger good feelings are good for survival. And when these feelings are bad for survival, we can "second guess" our neurochemical steering mechanism with our big cortex. That's what the cortex evolved for. But it can't work alone. It is always working along with our neurochemistry.

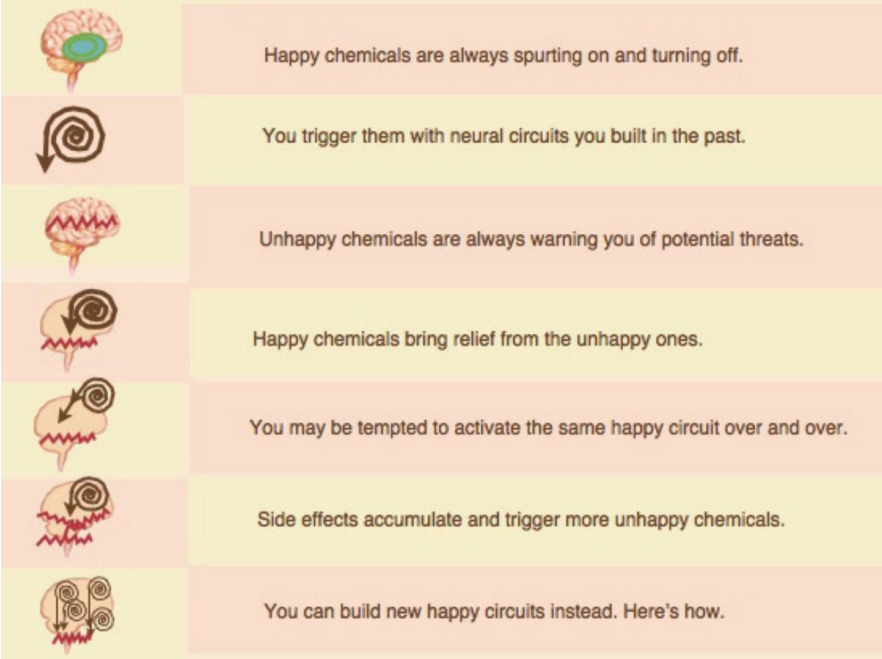
Each brain has a network of connections built from experiences that felt good in the past. These connections represent simple things like donuts and complex things like social trust and practical skills. By the time you are old enough to choose your own course of action, you already have a brain full of circuits that turn your neurochemicals on and off. These circuits are what you "know" about how to survive in the world. You can stop yourself from acting on your neurochemical impulses, which gives

your brain time to search for a Plan B. But you are always relying on your existing pathways to plot a course that leads away from cortisol and toward happy chemicals.

When you succeed at triggering happy chemicals, the spurt is soon over. To get more, you have to do more. That is how a brain keeps prodding a body to do what it takes to keep its DNA alive. Happy chemicals get re-absorbed and your awareness of survival threats resumes. You get that "do something" feeling, and you ponder your options by sending electricity down the pathways you have.

The brain's quest for happy chemicals often leads to a vicious cycle because of the side effects. "Everything I like is illegal, immoral or fattening," goes the old saying. Happy chemicals exist because of their side effects, thanks to natural selection. When happy chemicals dip and we seek more, we get more side effects. They can accumulate to the point where they trigger unhappy chemicals. Now, the behavior you use to trigger happiness creates more unhappiness. And the more cortisol you produce, the more motivated you are to repeat the behavior you expect to make you happy. You are wired for frustration.

Vicious cycles are everywhere. Some of the most familiar ones are alcohol, junk food, compulsive spending, and drugs. Other well-known vicious cycles are risk-taking, getting angry, falling in love, and rescuing others. Each of these behaviors can make you feel good in a moment when you were feeling bad. The good feeling means happy chemicals are building connections, making it easier to trigger good feelings in that way in the future. Over time, a neural superhighway develops. Now your brain activates that behavior effortlessly. But too much of a good thing triggers unhappy chemicals, which let you know that it's time to stop. It's hard to stop, however, because your brain seeks happy chemicals. So the same behavior can trigger both happy and unhappy feelings at once, like driving with one foot on the accelerator and one on brake.



You can stop this vicious cycle in one instant. Just resist that "do something" feeling and live with the cortisol. This is not easy because cortisol screams for your attention. It did not evolve for you to sit around and accept it. But you can build the skill of doing nothing during a cortisol alert, despite that urge to make it go away in any way possible. That frees you to activate an alternative happy circuit instead of the old-familiar one. A virtuous circle starts in that moment.

But what if you don't have an alternative circuit at the ready? That's where this book comes in. It shows how new highways to your happy chemicals can be built. That may feel awkward because we rely so heavily on circuits that built themselves. We've all built circuits with conscious effort, like the ones that do long division and define vocabulary words. But the circuits that tell you what's good and bad for you are built from lived experience. You have to feed your brain new experiences for it to learn new ways of feeling good. And you have to keep doing it until the new circuit is big enough to compete with the ones you've already built by accident.

We think it should be easy to build new circuits since our old ones got there without struggle. This book shows why it's so hard to remodel your neural infrastructure.

Your brain likes your old circuits, even when they lead you astray. That's because electricity zipping down a well-worn pathway gives you the feeling that you know what's going on. When you refuse to use your old pathways, you may feel lost. You may even feel like you're threatening your own survival, though you're doing precisely the opposite.

The bad feeling of resisting a habit eases once a new habit forms. You can do that in 45 days. If you repeat a new thought or behavior every day without fail, in 45 days a new pathway will invite electricity away from the old path. The new choice will not make you happy on Day 1, and it may not make you happy on Day 40. Even on Day 45, your new circuit cannot trigger happy chemicals constantly. But it can trigger enough to free you from a vicious cycle. On Day 46, you'll be ready to start building another new circuit. Over time, you can build many new ways to trigger happy chemicals, as long as you're willing to repeat a behavior for 45 even if it doesn't feel good.

A vicious cycle is easy to see in someone else. That's why people are often tempted to take charge of other people's happiness, even while doing nothing about a vicious cycle of their own. But each person must manage their own limbic system. No one else can reach into your brain and trigger your happy chemicals for you. Only you can make connections in your brain, and you cannot make connections in someone else's brain. If you focus your life on other people's brains, you may fail to fix their vicious cycles and your own.

Modern society is not the cause of vicious cycles. Our ancestors had their own variations. They felt good when they made human sacrifices, and when the good feeling passed they made more sacrifices. Over time, humans developed better ways to trigger happy chemicals and avert unhappy chemicals.

It's not easy being a mammal with a big cortex. We have enough neurons to imagine things that don't exist instead of just focusing on what is. This allows us to improve things, but it also leave us feeling that something is wrong with the world as it is. A vicious cycle often results. The more you make yourself happy by imagining a "better world," the less invested you are in the world as it is. This can lead to bad decisions that trigger unhappy chemicals, motivating you to live in your imagined world even more. Reality is a disappointment compared to the ideal world that a cortex can imagine.

What About Love?

You've probably heard that loving others is the key to happiness. It's a good principle, but it only provides limited insight into your happy chemicals.

Love triggers huge neurochemical ups and downs because it plays a huge role in the survival of your genes. Our brain uses happy chemicals to reward behaviors that promote what biologists call "reproductive success." You may not care about reproducing and you surely have another definition for success. You may feel sure that your love is selfless and completely unconcerned with your genes. But you are here today because your ancestors successfully competed for mates and kept their offspring alive long enough to successfully mate. Your limbic system was naturally selected over millions of years for its ability to reproduce. As soon as a mammal is safe from immediate harm, its thoughts turn to reproductive success in all of its aspects.

Sex and romance are just the obvious examples. Nurturing children promotes your genes, so it's not surprising that it stimulates happy chemicals. Competing successfully for quality mates promotes your genes, and it stimulates happy chemicals. Over the millennia, some DNA made a lot of copies of itself and some made none at all. A conscious intent to reproduce is not necessary for neurochemicals to motivate behavior. For example, animals avoid in-breeding. They don't do that consciously, but natural selection weeded out in-breeders, leaving brains that produced alternative behaviors to flourish. Our brains are inherited from the flourishers.

Unhappy chemicals promote reproductive success too. In nature, females often watch their offspring get eaten alive by predators, and males suffer conflict and rejection in their quest for mates. The bad feeling of cortisol motivates an animal to do what it takes avoid threats and trigger happy chemicals. Bad feelings motivate a mother mammal to guard her child constantly, and search for the nourishment she needs to sustain her milk. Bad feelings motivate a male mammal to avoid conflicts he's likely to lose, and risk conflicts he's likely to win.

Social alliances promote reproductive success in the state of nature. Mammals with more social allies and more status in their social group tend to have more surviving offspring. Natural selection produced a brain good at social skills as a result. The mammal brain promotes social

success by rewarding it with happy chemicals. And if your social standing is threatened, the mammal brain warns you with cortisol because it's a threat to your DNA in the state of nature.

Each happy chemical rewards love in a different way. When you know how each one is linked to reproductive success, the frustrations of life make sense.

Dopamine is stimulated by the "chase" aspect of love. It's also triggered when a baby hears his mother's footsteps. Dopamine alerts us that our needs are about to be met. Female chimpanzees are known to be partial to males who share their meat after a hunt. Females reproduction depends heavily on protein, which is scarce in the rainforest. So opportunities to meet this need trigger lots of dopamine. For humans, finding "the one" makes you high on dopamine because a longer quest to meet a need stimulates a longer surge.

Oxytocin is stimulated by touch, and by social 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, oxytocin is stimulated by everything from holding hands to feeling supported to orgasm. 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. Sex triggers a lot of oxytocin at once, yielding lots of social trust for a very short time. Childbirth triggers a huge oxytocin spurt, both in mother and child. Nurturing other people's children can stimulate it too, as can nurturing adults, depending on the circuits one has built. Friendship bonds stimulate oxytocin, and in the monkey and ape world, research shows that individuals with more social alliances have more reproductive success.

Serotonin is stimulated by the status aspect of love– the pride of associating with a person of a certain stature. You may not think of your own 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 created a brain that seeks status by rewarding it with serotonin. This may be hard to believe, but research on 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 a desirable individual, it

triggers lots of serotonin, though you hate to admit it. And when you are the desired individual, receiving admiration from others, that triggers serotonin too. It feels so good that people tend to seek it again and again.

Endorphin is stimulated by physical pain. Crying also stimulates endorphin. If a loved one causes you pain, the endorphin that's released paves neural pathways, wiring you to expect a good feeling from pain in the future. People may tolerate painful relationships because their brain learned to associate it with the good feeling of endorphin. Confusing love and pain is obviously a bad survival strategy. Roller-coaster relationships are easier to transcend when you understand endorphin.

The sex hormones, like testosterone and estrogen, are central to the feelings we associate with love. They are outside the scope of this book, however, because they do not trigger the feeling of happiness. They mediate specific physical responses instead.

Why did the brain evolve so many different ways to motivate reproductive behavior? Because keeping your DNA alive is harder than you'd think. Survival rates are low in the state of nature, and mating opportunities are harder to come by than you might expect. Your genes got wiped off the face of the earth unless you made a serious effort. Of course, animals don't consciously intend to promote their genes. But every creature alive today has inherited the brain of ancestors who did what it took to reproduce.

There is no free love in nature. Every species has a preliminary qualifying event before mating behavior. Creatures work hard for any mating opportunity that comes their way. In the end, some DNA makes lots of copies of itself, while other DNA disappears without a trace. You may say you don't care about your DNA, but you've inherited a limbic system that does.

Unhappy chemicals creep into your life as you seek love in all its forms. Animal brains release cortisol when their social overtures are disappointed. The bad feeling motivates the brain to "do something." It reminds you that your genes will be annihilated if you don't get busy. You don't need to tell yourself that in words. Natural selection created neurochemicals that give you the message non-verbally.

Losing love triggers a huge surge of unhappy chemical. That actually promotes genetic survival because the pain you associate with the old attachment leaves you available for a new attachment. The brain has

trouble ending attachments because the oxytocin pathway is still there. But if you can't break an attachment, your genes are doomed. The pain of lost love rewires your brain so you can move on. Cortisol promotes love by helping you avoid places where you're not getting it.

Love often disappoints for a subtle reason that's widely overlooked. A young child learns to expect others to meet their needs. Children cannot meet their own needs, so love equals survival to the young brain. Eventually you have to start meeting your own needs. When the expectation of being cared for is disappointed, it can feel like a survival threat. Childhood is a luxury evolved by mammals, but it comes with a painful transition from dependence to independence. Lots of cortisol is triggered as you learn that you cannot trust the world to meet your needs for you. This independence is natural, for a species can only survive if each generation learns to meet its needs without its parents. And if you had parents who were not trustworthy in the first place, you had more cortisol, sooner. The sense of disappointment and loss motivates people to let go of childhood expectations and find love in adult ways. And that keeps our genes alive.

When disappointment in love gives you that bad cortisol feeling, your brain looks for ways to trigger good feelings. There are limitless ways to do that. Sometimes a person seeks a new mating partner, and sometimes a person focuses on nurturing children. Sometimes a person tries to contribute to mankind at large and sometimes a person uses violence to hold onto their "loved" ones. These behaviors seem very different, but they are all motivated by the expectation of happy chemicals. Expectations depend on the circuits each individual has built from life experience.

In modern times, many people expect romantic love to be part of their life all the time. Expectations were different in the past. Sex created children, and if you lived to middle age, you could expect to be surrounded by grandchildren. But people had the same basic neurochemistry. No matter how you learn to trigger happy chemicals, each burst lasts for a short time and you have to do more to get more. Maybe that's why love songs are always popular. They activate neurochemicals with fewer messy side effects.

Love triggers a cocktail of neurochemicals because it's so highly relevant to survival. But it cannot guarantee non-stop happiness. It

feels like it can while you're enjoying the cocktail, however, so your brain may learn to expect that.

The Chapters Ahead

Chapter 1 describes the distinct feeling of each happy chemical. We'll see how dopamine, endorphin, oxytocin, and serotonin evolved to reward specific survival behaviors. And we'll see how rewards create expectations about future rewards.

Chapter 2 explores unhappy chemicals. They get our attention when we face threats. Unhappiness will always be with us because a big-brained social animal can always find potential threats to its prospects. The chapter presents an array of threats that alarm your limbic system without your intellect knowing why.

Chapter 3 shows how disappointment leads to a vicious cycle. Disappointment is inevitable because happy chemicals evolved to alert you to *new* survival information. The same old happy-chemical stimulators don't give you the happiness you expect after a while. But you keep expecting because the pathway is still there. If you respond by repeating the behavior over and over, side effects accumulate. The chapter describes dopamine disappointment, endorphin disappointment, oxytocin disappointment, and serotonin disappointment. The vicious cycle can stop if you build new happy circuits.

Chapter 4 shows how neural circuits develop. Life experience makes permanent physical changes in brain cells. We'll look at five kinds of physical changes, and why they occur more easily in youth. We'll see how repetition and emotion control learning, including social learning.

Chapter 5 presents strategies for building new happy circuits. Repeating a brief thought or action each day for 45 days builds a new superhighway, which relieves dependence on an old vicious cycle. Alternatives for dopamine happiness, endorphin happiness, oxytocin happiness, and serotonin happiness are suggested as a starting point.

Why do people choose to be unhappy rather than build new happy circuits? Chapter 6 explores common thought habits, such as: "I shouldn't have to do that." "It sounds selfish." "I can't lower my standards." "The system has to change first." "I won't be able to do it." Those who

refuse to take responsibility for their own happy chemicals often try to make themselves responsible for other people's happy chemicals, and expect others to be responsible for theirs. The chapter explains why this strategy fails.

Chapter 7 addresses the burden of choice. We all have free will because we can use our pre-frontal cortex to inhibit our neurochemical impulses. You can make choices that increase your happiness, but it doesn't happen automatically. It requires a constant weighing of trade-offs between the potential rewards of one course of action and another. We can never predict the outcome of our actions with certainty. This exposes us to uncertainty, disappointment, frustration, and cortisol. Choice brings a huge potential for unhappy chemicals. Since the brain strives to avoid unhappy chemicals, people find ways to avoid choice. One way of doing that is to imagine "a better world" that supplies happiness constantly and eliminates unhappiness. It feels good to imagine your happiness guaranteed, without the pressure of difficult trade-offs. It feels bad to see how the real world falls short of your ideal world. But if you seek happiness by living in an imagined world, you leave your real-world choices to others. The result is disappointment and another vicious cycle. Chapter 7 shows how to break it by accepting the trade-offs and uncertainties inherent in free choice.

The Author's Note at the end of the book provides background about my personal quest for happy chemicals. The Source Note that follows explains why this book is not footnoted. At the end is a collection of postcards displaying the book's core ideas. Color downloads of these postcards are available at no charge at meetyourhappychemicals.com.

And now let's meet the happy chemicals.

with her the way New York subway riders used to avoid eye contact for fear of attracting predators. Of course, I didn't know I was doing this. I thought I was being good by staying out of the way. When I grew up, I was horrified to learn that people think badly of you if you don't make eye contact.

I had little opportunity to interact with other kids when I was young. I think I was afraid to play with my brother because the noise upset my mother. When I played baseball on the street with the neighborhood kids, the conflicts over points made me very anxious. They were just verbal arguments– nothing ominous, but I was triggered in a way I didn't understand.

My elementary school was full of kids bussed in from the nice part of town that hadn't gotten its own school yet. I was tracked into accelerated classes where almost all of the kids were Jewish. "The Jews won't like you," my mother told me. When they invited me to their homes, she complained about having to drive me. When I got invited to their parties, my curfew was soon after the starting time. I didn't get invited very often. I didn't know why, but I knew I was treated better at school than I was at home.

My mother's school was undermined by moving eleven times when she was young. Her parents split up six times and got back together five times, and each time my grandmother insisted on moving to avoid the social stigma of having a man appear or disappear. They moved one subway stop each time, making it from Brooklyn to Queens by the final split. At the time, when my mother was fourteen, my grandmother's income went up thanks to production for World War II.

My mother's older sister was schizophrenic. This diagnosis came when my aunt was forty-two and the passing of my grandmother forced her to interact with the world directly for the first time. While my grandmother was alive, my aunt often got into fights with people, but they went to the factory and home together each day. When my aunt had to live alone, she started calling the police and accused her landlady of breaking into her refrigerator and adding pepper to her carrots. The landlady got her evicted and my aunt lived on the subway until the police found her and she was finally institutionalized.

Once I had a therapist who said it's impossible for schizophrenia to be overlooked until you're forty-two years old. That made me feel bad. It reminded me that there's a world in which angry, raging