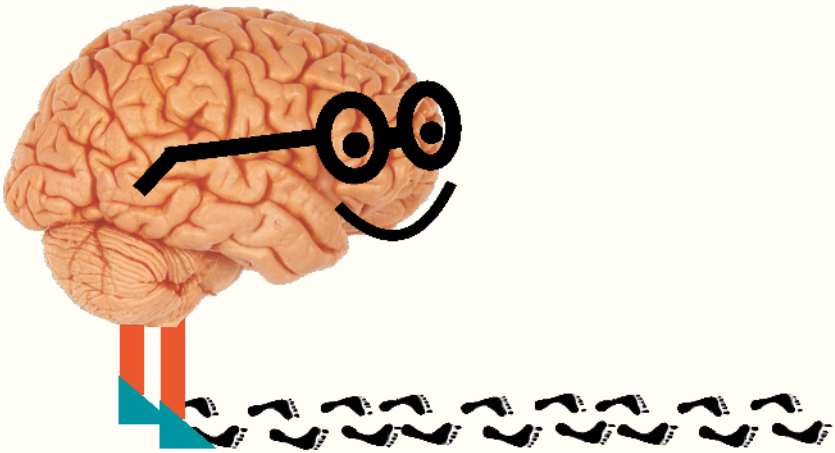
The

Happy Brain Guide for Teens

and the Teen Brain in Everyone



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Note from Dr. Breuning:

I am interested in your opinion about:

- anything that doesn't make sense.
- anything you want to know more about.
- what you eager to tell others.
- how they react when you tell them.

This is an early draft. You don't need to tell me about typos since there will be changes. And I don't need hear what other writers are saying about these topics.

I respect your parents. Share this with them if they're interested. They are welcome to comment to me if they're interested.

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is Founder of the Inner Mammal Institute and Professor Emerita of Management at California State University, East Bay. Her books include Habits of a Happy Brain, Tame Your Anxiety, and the Science of Positivity. As a teacher and a parent, Loretta was not convinced by prevailing theories of human motivation. Then she learned about the brain chemistry we share with earlier mammals and everything made sense. She began creating resources that have helped thousands of people make peace with their inner mammal. Her many books have translated into Spanish, Russian, Chinese, Arabic, French, Turkish, and German. Complete details at InnerMammalInstitute.org.

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The Happy Brain

Where Good Feelings Come From

Our brain isn't designed to release good feelings all the time. It's great to know this! Nothing is wrong with you!

Good feelings are caused by brain chemicals we've inherited from earlier animals (dopamine, serotonin, oxytocin, and endorphin). These chemicals have a job to do; they are not meant to flow for no reason. When you know the job they do in animals, you can see how they work inside you.

Our power over our emotions is limited, but you can learn to grab that power. You can create more positive emotions and relieve negative ones. And you can accept your ups and downs as a natural part of your brain doing its job.

Our brain evolved to promote survival, not to make you feel good. It rewards you with happy

chemicals when you see a way to promote your survival. But our brain defines survival in a quirky way, which is why we do quirky things to feel good. When you know how your brain works, you can find healthy ways to stimulate happy chemicals. This book shows you how.

Why Is It So Hard?

We humans have two brains. We have the operating system inherited from earlier mammals, and a unique human cortex on top. Our two brains are not on speaking terms because the mammal brain can't process language. When you talk to yourself, it's all in your cortex. But your mammal brain controls the happy and unhappy chemicals. If you want to feel good, you have to make peace with your inner mammal.

That's hard because your mammal brain cannot tell you in words why it feels good or bad. And when your cortex tries to figure it out, it doesn't make sense.

To make things even harder, your mammal brain cannot anticipate the consequences of your actions. You need your cortex to do that. The human cortex

can anticipate future survival needs instead of just relying on immediate impulses. We have two brains because we need both.

If you do something bad for your future, your human brain gets it. It paints a bad picture of your future to help your animal brain get it. Your animal brain responds with bad-feeling chemicals. Now what? You can teach your two brains to work together so you feel good in the short run by doing things that are good for you in the long run.

It's not easy.

That's why people tend to flop back and forth—one minute acting on short-run impulses and the next minute worrying about the long run. The worry feels bad so they look for a quick way to feel good, which gives them more to worry about. It's a bad loop!

You can escape that loop when you understand your brain. You can find ways to give your inner mammal what it needs while satisfying your human concern for the future.

To Make Things Harder Still…

Happy chemicals are released in short spurts that are soon gone. You always have to do more to get more. And you can't get them from the same old thing because our brain habituates to the rewards you have. It focuses on what you don't have because meeting an un-met need stimulates happy chemicals. If you were thirsty in the desert, you'd be thrilled if you saw water in the distance, but unlimited clean water in your life today doesn't make you happy.

Does this seems frustrating? We've inherited the brain that kept our ancestors alive. You are here today because happy chemicals motivated your ancestors to take one step after another in a harsh world. They kept striving because happy chemicals made it feel good. Your life is extremely safe and comfortable compared to your ancestors. But your happy chemicals are stimulated the same way: by taking one step after another to meet your survival needs.

I was thrilled when I learned about my inner mammal. No one taught me, and no one applauded me for figuring it out. But I kept taking steps. I

studied old research on animal behavior and new research on the brain, and connected the dots. After many years, the word spread. I wish I'd learned sooner. I'll be happy if you learn sooner.

What Makes A Mammal Happy

You may think animals are always happy, but the facts are quite different. Animals work hard to get food and they often go hungry. Predators threaten to eat them alive at any moment, and they may watch their children get eaten alive. Finally, animals compete. Any energy left after meeting their basic needs is spent dealing with these competitive urges.

This is probably not what you've heard. You may think animals live in a utopia of peace and love. The thought of animals suffering may upset you. But when you know the facts, you will understand the brain we've inherited. It releases a good feeling when it sees something good for its survival, and a bad feeling when it sees something bad for its survival.

But the animal brain defines survival in a curious way:

1. it cares about the survival of your genes, and
2. it relies on neural pathways built in youth.

This is not what you think in words, but when you understand these two factors, you will understand yourself and everyone around you.

1. The urge to keep your genes alive

Animals don't know what genes are, yet they constantly strive to do things that spread their genes. This means more than making babies because it's so hard to keep a babies alive in the state of nature. Animals have evolved strategies to give their genes an advantage. They focus on these strategies as if their life depends on it because their brain rewards them with happy chemicals when they do.

Brains that reward you with a good feeling when you reproduce were more likely to survive. Natural selection built a brain that rewards you with a good feeling when you help your genes survive. Our brain is inherited from survivors. It rewards you with a good feeling for reasons that your cortex has trouble making sense of. It alarms you with a bad feeling when you see something bad for the survival of your genes, even though you are not consciously thinking about your genes.

You may insist that you don't care about your genes. But when your special someone looks at someone else, a survival-threat feeling is released. You can manage such feelings more easily when you know where they come from.

2. Our happy chemicals get wired in youth

We humans are not born hardwired. A turtle is born hardwired with the skills it needs to survive. It leaves home the instant it cracks out of its shell, and if it doesn't leave fast enough, a parent eats it. (Why waste good protein?) A turtle doesn't have a childhood. It doesn't store knowledge. It is born with the knowledge of its ancestors.

A turtle has very few neurons, so it has very little ability to store information. We have billions of neurons just waiting to be connected up into new knowledge. But they are not connected at birth. We have to connect them by interacting with the world around us.

The bigger an animal's brain, the longer its childhood, because it takes time to connect neurons from experience.

The bigger a creature's brain, the less hooked up it is at birth. A gazelle can run with the herd an hour

after it's born. A mouse will be a parent at one month old. A turtle runs away from home at birth because it already knows everything. We humans are more helpless and vulnerable at birth than other creatures. We need many years to wire in essential survival knowledge.

Our knowledge builds in an interesting way: neurons connect when happy chemicals flow. Happy chemicals are your brain's signal that an experience is rewarding and worth remembering. Connections build between all the neurons active at the moment when your happy chemicals turned on. This builds a pathway that turns on more happy chemicals in similar future situation.

For example, a monkey is happy when it sees a piece of fruit hanging on a tree. Neurons connect, which wires the monkey to turn on the good feeling the next time it sees that situation. By the time a monkey is two years old, it has stored enough knowledge to meet its own survival needs. Then it will start having babies.

In the world before birth control, humans had babies at a young age. Their core knowledge had to be ready because children cry if you don't find food. Eighteen years is a long time to wire up your brain

compared to other animals. Our brain is designed to wire itself in youth, and then to rely those pathways to give the next generation a chance to wire.

Yet we are rarely aware of the wiring we build in youth. We don't notice our neural pathways and we don't notice ourselves building them. In fact, many people have the impression that they ignored everything they learned when they were young and discovered everything after they left home. Of course we are capable of learning in later life, but the pathways built from early experience shape us more than we realize. They are the foundation on which our later experience is built. The better you understand your foundational circuits, the better you can manage your brain.

How Your Brain Knows What's Good

You may be wondering how your brain decides what is good for you. If children lack survival knowledge, how does a child's brain know when to turn on the happy chemicals? And how does that work in a world where survival means more than climbing toward bananas and spreading your genes?

The answer is different for each of the happy chemicals because they each reward a different survival behavior. Here's a short introduction to each one: dopamine, serotonin, oxytocin, and endorphin

First, let's review what they have in common:

- They are triggered by neural pathways built from past experience. You start building these connections as soon as you're born. Every time you feel good, neurons connect to help you find more of that. Happy chemicals are your brain's way of saying, "This is valuable. Get more of it!"
- They are all released in short spurts that are soon metabolized, so you always have to do more to get more.
- They are not controlled by your verbal cortex. They are controlled by brain structures that all mammals have in common, like the amygdala, hippocampus, and pituitary. Your verbal brain is just guessing about what's going on.

The Good Feeling of Dopamine

If you were a little monkey, you'd wake up hungry in the morning. You couldn't buy food so you'd have to look around for it. You scan your surroundings, and when see a possibility, your dopamine surges. That feels great so you start climbing toward it. Each step closer stimulates more dopamine. When it's just within reach, dopamine surges! But then it stops. It has done its job. Now you have to meet another need to get more of the good feeling.

A monkey is not born knowing which fruit to eat and how to reach the fruit. It learns from experience. It is born hungry with an urge to suck. It soon learns that mother's milk relieves the bad feeling of hunger. While it's sitting on its mother's lap, it sees its mother grasp food and put the food into her mouth. Bits of food fall onto the mother's chest right in front of the baby's eyes. The little monkey mirrors the mother's action of putting food in its mouth. It doesn't know what food is, but mirror neurons motivate us to imitate the actions of others.

When the baby tastes the food, dopamine! The brain can detect nutrients that meet its needs. The

baby repeats the action because the dopamine feels good. This builds the pathway that motivates the baby to seek more food, and each success adds knowledge to that neural network.

From a human perspective, dopamine is joy and excitement. But to really understand it, you have to understand the job it evolved to do. Imagine you're a hungry lion. If you run after everything, you would starve to death. You have to save your energy for a good target in order to prevail. You scan for opportunity, and your dopamine surges when you see something within reach. Dopamine releases the reserve tank of energy, and you go for it. If a lion didn't hunt until it was almost starved, it wouldn't have enough energy to catch something. Dopamine motivates a lion to scan for opportunity sooner because it feels good.

You are always scanning for opportunity to meet your needs because dopamine makes it feel good. When you see something that met your needs in the past, dopamine is released and it motivates you to step toward it. Each step closer stimulates more dopamine. When you're just about to get it, you feel great. Then the dopamine stops. Its job is done.

For most of human history, it was hard to meet your survival needs. Imagine gathering acorns and then having to shell them, grind them, and start a fire to cook them. Today, you can satisfy your hunger in a few seconds. You haven't used up much energy and you haven't stimulated much dopamine.

Dopamine makes you feel good when you anticipate a reward. You define rewards with neural pathways built from your unique individual dopamine past. Thinking about pizza or ice cream is one way to stimulate it, but you can anticipate the long-term consequences. You can also anticipate the long-term need for skills in order to pay for food and shelter. You can train your brain to get excited about steps that reward you in the long run.

Your brain releases dopamine when you expect to meet a need. Let's say you're hungry and you eat a slice of pizza. Now you're not hungry anymore, so pizza doesn't meet a need. How can you get more of that great dopamine feeling? The wiring you built from past experience tells you that pizza will work. You think about having more pizza. Fortunately, you have two brains. You can anticipate the bigger dopamine spurt you would get from focusing on an unmet need.

Social needs get our attention once basic needs are met. Let's look closer at the chemicals that create social rewards.

The Good Feeling of Oxytocin

When you enjoy the safety of social support, your brain is releasing oxytocin. Animals can let down their guard a bit when they have safety in numbers. Oxytocin creates the good feeling that it's safe to let down your guard. Our verbal brain calls this feeling "trust."

Oxytocin feels so good that we'd like to have it all the time, but it's not safe to trust everyone everywhere. The mammal brain is designed to make careful decisions about when it releases the good feeling. Mammals are amazingly picky about who they trust, and reptiles don't trust anyone. Let's zoom in on the workings of oxytocin in nature.

A reptile is likely to get bitten if it gets too close to another reptile. It keeps its distance from other reptiles in order to survive. Reptiles only release oxytocin for a few seconds while mating and while laying eggs.

Mammals evolved the ability to live with smaller individuals without eating them. They also evolved attachment between mother and child. Oxytocin makes it happen. This chemical triggers labor contractions and lactation in mammals.

Every baby mammal is born into a surge of oxytocin, which creates trust between mother and child. That oxytocin is soon metabolized, but touch triggers more of it. This is why all mammals cuddle or lick their newborns.

Neurons connect when oxytocin flows, so each little mammal gets wired to let down its guard in circumstances similar to its early oxytocin experiences.

But every little mammal learns that it's not safe to trust sometimes. When betrayed trust leads to pain, unhappy chemicals surge, which wires a little mammal to withhold trust in similar future circumstances. We'll learn more about unhappy chemicals in the following chapter. First, let's look closer at how the mammal brain builds its oxytocin circuits.

Small-brained mammal have a small ability to store new information about who to trust. The bigger a mammal's brain, the more it can constantly

update its circuits. For example, a gazelle has a small brain, and it learns to trust critters like the ones it sees and smells while with its mother. This circuit is only updated when something huge happens.

A monkey has a lot more neurons than a gazelle, so it is able to update its trust circuits a lot. A monkey can build trust bonds with individuals instead of just generalizing about who is in the herd and who is not. And when an individual bond goes bad, a monkey can change a happy circuit to an unhappy circuit.

We humans have a lot more neurons than a monkey. We invest a lot of effort in deciding when to trust. We want that great oxytocin feeling all the time, but we also want to avoid the awful threatened feeling that surges when our trust is disappointed.

There is no simple answer. Natural selection built a brain that rewards you with a good feeling when you stick with the group. But the group gets on your nerves. Their horns and hooves get in your way when you try to eat. The competitiveness of mammals is motivated by the next chemical, serotonin. The result is a complex dilemma: a bad feeling when you're with the group and a bad

feeling when you leave it. It's not easy being mammal! You dream of wandering off to greener pasture that isn't trampled by all the others. But when you leave, your oxytocin falls and you feel like you're about to be eaten alive.

Monkeys have developed an interesting way of keeping their oxytocin flowing: they groom each other's fur. You have probably seen images of a monkey looking for bugs in another monkey's fur (and eating any bugs they find!). Grooming feels good because touch stimulates oxytocin. But any monkey close enough to touch you is close enough to kill you, so the monkey brain makes careful decisions about who to groom with. Sometimes, the monkey you groom refuses to give you a grooming in return. They may reciprocate in another way, however, like protecting you from a predator. There are many angles to consider on the path to social rewards, and we primates use our big brain to consider them.

The Good Feeling of Serotonin

Mammals are competitive. They grab food from others sometimes, even from children. They compete for mating opportunity too. When they come out on top, they feel good. This may seem shocking, and at the same time obvious. It's shocking because we are taught not to feel good about one-upping others, and we're taught to see animals as loving and cooperative. It's obvious because we see can see this impulse all around us. We just hate to see it in ourselves.

Serotonin creates the good feeling of being in the one-up position. Serotonin is not aggression but a calm confidence in your own strength. Animals constantly compare themselves to others to avoid getting bitten by a bigger individual when they reach for food or mating opportunity. If they see that they're in the position of weakness, cortisol is released and they hold back. (More on that in the next chapter.) If they see that they're in the position of strength, serotonin is released and they forge ahead.

This fact of life makes us uncomfortable. It can make you miserable even though your life is better

than your ancestors' wildest imaginings. When you don't understand your own longing for the one-up position, you think other people are doing it to you. When you accept your natural urge for serotonin, you know you are doing it to yourself. Then you can do something different.

You can't make the world bow at your feet, but you can remind yourself that your survival is not actually threatened when you fail to get the dominance you seek.

Let's say you long to be a great performer. Your serotonin surged the first time you got applause. It surged again when your performance got special recognition. That built a pathway in your brain that expects more good feelings from more performances. But there comes a day when someone else gets the applause you were counting on. You surge with cortisol, the survival-threat chemical. You feel sure you'd be happy forever if only you get that next gig. But each gig you get strengthens the expectation that you need another to feel good.

You have probably heard of celebrities who are unhappy. You may even mock and disdain them. Yet part of you is sure you'd be happy if you had what they have. You are not thinking this with the verbal

part of your brain. You are thinking it with serotonin pathways paved by past experience.

It's not easy being mammal. If you assert too much, you will hurt your trust bonds and lose oxytocin. But if you don't assert, you will miss the serotonin. There is no simple answer, just like there was no simple answer for dopamine and oxytocin. Each mammal calls its own shots based on its own past experience, and each mammal lives with the consequences.

In today's world, admitting to your own urge for social dominance is so taboo that our conscious mind must find other ways to stimulate it. You embrace the goal of rescuing others, or you accuse others of a thought crime, and thus put yourself in the one-up position without openly seeking it.

You may be clinging to the idea that some people are luckier than you. You may insist that they were born in the one-up position and enjoy the effortless happiness that you are deprived of. But if you had what they have, you would soon be comparing yourself to others and be wanting more. You would soon feel like your survival is threatened by others getting ahead of you. No one has effortless happiness. In fact, other people are probably looking

at you right now and thinking they would be happy if only they had what you have.

Finding good serotonin strategies is a challenge for everyone. Neurons connect when serotonin flows, and that wires you to expect serotonin where you got it before. If you hit a home run in kindergarten, you built a serotonin circuit from that. If you punched your brother to get his cookie, you wired your brain from that. Past experience is not a good predictor of what will feel good in the long run, but each brain uses the circuits it has until it builds new ones.

The Good Feeling of Endorphin

A gazelle releases endorphin when a lion sinks its fangs into the gazelle's flesh. Endorphin creates a euphoria that masks pain. This helps the gazelle run for its life despite the pain. The good feeling only lasts a few minutes. After that, the gazelle is either escaped or dead. If it escapes, it will feel pain, because pain is nature's signal that an injury needs protecting.

You have felt endorphin if you've taken a hard fall and gotten up thinking you were fine, only to

realize twenty minutes later that you were injured. If your ancient ancestor broke their leg while hunting, endorphin made it easier for them to find help. The good feeling wore off in a few minutes, which told the hunter not to walk on the leg. Endorphin evolved for survival, not to make us happy.

It takes real physical pain to stimulate endorphin. We are not meant to inflict pain on ourselves to enjoy it. Yet some people are tempted to do that.

Runner's high is the well-known example. Runners do not get an endorphin high on every run. They have to run to the point of pain to trigger it. This is a dangerous choice because the body adapts, so it takes more and more injury to stimulate it. This is *not* a good survival strategy.

Starving triggers endorphin because the brain perceives low blood sugar as pain. But your body adapts so you have to starve more and more to stimulate it. This is a very bad survival strategy. All forms of self-harm are bad strategies.

Fortunately, laughing triggers a bit of endorphin because it activates deep muscles that don't get a lot of use. Instead of chasing big highs, we can enjoy small endorphin flows with moderate exercise and regular laughing.

Hot pepper triggers a bit of endorphin, but if you eat it every day, you have to go hotter and hotter to feel it. A hot tub triggers endorphin but the same limits apply. We are not meant to chase endorphin. We can just be grateful to have it for emergencies.

How Can I Feel Good Right Now?

Maybe you're hoping to feel good right now, before reading the whole book. You can stimulate the joy of dopamine right now with this simple trick. Think of a goal you can accomplish in the next hour— maybe something you've wanted to do for a while. Now do it! You will feel great when it's done because dopamine is released when you take steps that meet your needs. I had a sock drawer that I couldn't close and I was always frustrated but never did anything about it. I had a friend who drifted away and I often thought of writing her but never did. I had a delicious recipe I wanted to cook but never got around to it. Then I learned to say, "Today's the Day!," and do it. I was surprised at how good I felt when it was done. So I learned to say, "This is the Week!," "This is the Month!," and

“This is the Year!.” Now I get a lot of small dopamine boosts by reaching a lot of small goals.

What matters is not the sock drawer or the friend or the recipe— it’s the dopamine pathway I build when I get things done. Each success builds the pathway that expects success in the future. I trained my brain to focus on the joy of approaching rewards instead of on disappointment and frustration.

Feeling good right now is a big challenge for the big human brain. We are different from animals because our big cortex can anticipate the future consequences of our actions. If you do whatever feels good right now, you are likely to have bad consequences in the future. To feel good in the long run, you need to understand what makes your mammal brain happy and then find sustainable ways to give it that.

Why Haven’t I Heard This Before?

You may be wondering why you’ve never heard this view of happiness. Most people don’t know about their mammalian happy chemicals— even

people in the science community. Many people find this information hard to accept.

One reason it's hard to accept is because we are telling ourselves this with our verbal brain. It's hard to believe you are seeking dopamine, serotonin, oxytocin, and endorphin when you are not thinking that in words.

The mammalian facts of life are also hard to accept because they conflicts with prior beliefs about happiness. There are many different beliefs and none of them account for the mammal brain. There's the medical view of happiness which suggests you can get it from the doctor. There's the political view of happiness which suggests you can get it by fighting "our society." And there's the spiritual view which seeks happiness in virtue. You are free to have your own beliefs but you can benefit from the biological facts.

If you've read this chapter, you know more about your happy chemicals than the average person. But the facts are uncomfortable. It's hard to think your brain is not designed to make you happy. It's hard to think the medical system or the political system can't deliver happiness. You may find it hard to be responsible for your own happy chemicals.

But you can find joy in this perspective. Nothing is wrong with you. Our brain evolved to promote survival. It saves the happy chemicals for steps toward unmet needs. In the modern world of comfort and abundance, our physical needs are met more easily, so we seek happiness from social rewards. But we are surrounded by other mammals trying to do the same thing. There is no fast, easy, guaranteed path to good feelings. If you stop expecting that, you are more motivated to take the constant small steps necessary to trigger happy chemicals in healthy ways.

The following chapters explore three big triggers: popularity, tests, attractiveness. They trigger big surges of happy chemicals in adolescent human mammals, and also big surges of unhappy chemicals. The point is not that you *should* care about these things. The point is that you do, because all mammals do. When you understand these natural impulses, you can direct your mind more easily. You can feel good in the short run in ways that will also feel good in the long run.

First, let's explore the unhappy chemicals, since they play a big part in a mammal's life.

2

The Unhappy Brain

Bad Feelings Are Natural

Bad feelings have survival value, just like good feelings. Bad feelings tell a mammal when to pull back just like good feelings tell a mammal when to push ahead. The animal brain needs bad feelings to notice threats the way it needs good feelings to notice rewards. Bad feelings are half of the mammalian operating system.

When you feel bad, your verbal brain may think someone or something is hurting you. But your mammal brain is just releasing a chemical called *cortisol*. Let's see what turns it on and what turns it off.

Cortisol is an ancient chemical found in mammals, reptiles, frogs, and even snails. It creates a "do something!" feeling. A body is eager to do what it takes to make the bad feeling stop.

When a fish swims into water that lacks oxygen, its cortisol surges and it swims urgently to find better water. Low oxygen stresses the fish's body, so it does what it takes to relieve the stress.

Cortisol surges in a gazelle when it smells a predator. The chemical prepares a gazelle's body to run for its life. This is why stress affects your whole body even though you don't consciously think you are being chased by a predator. It's easy to see why cortisol is called "the stress chemical."

Adrenaline is another unhappy chemical that's often confused with cortisol. The difference is simple. If you hear an emergency alarm, adrenaline is the chemical that freezes you so you find the cause. Cortisol is the chemical you release if you find someone breaking into your house. Cortisol says, "this is bad," so you shift from hoping it's a false alarm to preparing for action. Adrenaline creates a moment of urgent attention, while cortisol prepares you for longer efforts to tackle a threat.

This chapter explains how your brain decides that you are threatened, and how it relieves that threatened feeling. It all starts with something you already know about: neural pathways built from past experience.

Nature's Danger Radar

Cortisol makes you feel like you will die if you do make it stop. You don't have to think this in words because cortisol works without words. It helps to know there's a good reason for this natural alarm system. If a gazelle had to feel the pain of a predator's jaws before it learned to fear them, no gazelles would survive. Our ancestors needed a better warning system.

Nature's alarm system builds from experience. A gazelle is not born fearing predators. A baby gazelle might wander off into danger. Its oxytocin falls when it does, and a bad feeling starts. When it reunites with its mother, she bites it, and that builds the association between separation and pain. When its mother smells a predator, the baby feels her alarm with its mirror neurons. These factors wire the young gazelle with an effective alarm system. It soon learns to run when its herd mates run.

When a gazelle smells a lion, it would rather keep eating grass. It runs because the bad feeling of cortisol makes it hard to focus on other things.

Cortisol feels so bad that action to relieve it feels good.

This is easy to see in human life. People do things to relieve cortisol even when these things hurt them in the long run. The better you understand cortisol, the easier it is manage. We have inherited the danger radar of our ancestors. Our lives are much safer today, but our danger radar is still doing the job it evolved to do: scanning constantly for potential threats in order to act fast to relieve them.

Let's look closer at a mammal's response to danger. When a gazelle smells a predator, it scans for information before it runs, to be sure to run in the right direction. Then it scans for potential escape routes. It can do this quickly thanks to past experience. The big human cortex has a big capacity to scan for information about potential threats. Past experience wired you to quickly identify threats and potential escape routes.

Why We Feel Threatened

The brain evolved to protect you from touching a hot stove twice. It builds a cortisol pathway the first

time you feel pain, so the cortisol turns on sooner when you see something similar in the future. The next time you see a hot stove, cortisol warns you in time to avoid getting burned. The pathways are so efficient that your cortex doesn't notice what triggered them.

Cortisol pathways are huge. Anything that hurt you before built a circuit that tells you to anticipate harm in similar future circumstances. The younger you were when it happened, the more time the circuit has had to develop. Today, you may not even remember the original experience, but when you see anything even vaguely similar, you feel a surge of threat that your cortex struggles to explain.

We don't build our alarm system from rational analysis of future possibilities. We build it from whatever triggered our cortisol in the past. An amazing example is the girl who panicked when she heard laughter. The girl had been in a car accident that left her into a coma. When she woke up, she had no memory of the accident and the fact that her friends were killed. From then on, she had a huge cortisol surge when she heard people laughing. It's easy to see why when you know that she was laughing in the car at the moment of impact. The

pain of the crash triggered a huge cortisol surge, connecting all the neurons active at that moment. Thus, her brain connected the sound of laughter triggered to intense pain, and tried to warn her with cortisol surge in time to protect her.

Each brain builds its alarm system from its own unique experience. If you've had a safe life but you got left out of a birthday party long ago, that is where your brain goes today. If you were safe and warmed but you lost that one-up feeling, your cortisol responds to similar situations today.

This doesn't mean we must feel endlessly threatened. We can make the cortisol stop, even if the pathway is still there. The following section explains how to do that in detail. First, let's look closer at how our brain identifies a threat.

Our Quirky Cortisol Triggers

When your cortisol turns on, you think something is really wrong. You can't believe it's just a chemical triggered by an old pathway. So let's zoom in on some quirky reasons why cortisol is triggered. That makes it easier to accept your ups

and downs instead of believing something is really wrong. These quirks are amazing similar in all of us despite our individual past experience.

1. We are all born helpless and vulnerable.

You were born hungry and you had no idea what to do about it. Cortisol is released when blood sugar falls, and a baby cries when its cortisol surges. It's one of our few inborn circuits. And it works! Crying brings support that meets your survival needs. Over time, your ability to meet your own needs increases, but you also build your awareness of threats. It starts when you realize that the person feeding you can disappear and you can't control them. Yikes!

Humans are more vulnerable at birth than other creatures. A newborn elephant can walk because that's how it gets to its milk supply. A newborn chimpanzee can cling to its mother as she swings through the trees. We humans are born helpless. Our first experience in life is the feeling of needs we are powerless to meet. That desperate feeling that you can only cry is one of the first circuits you build in your brain— the foundation on which later circuits rest. Before you know what milk is and or survival is, you know how to turn on a full-body alarm.

2. We humans are aware of death.

Animals are not aware of death. Their brains focus on things you can touch. Humans can activate images internally instead of waiting for the external world to trigger us. We can build a mental image of our own mortality. We can anticipate a time that we will no longer exist. We terrorize our mammal brain with the idea that it will fail someday in its quest to survive.

Your inner mammal responds to the thought by looking for the threat, but no one knows know they will die of. It could be anything, so you scan for everything. The safer you are, the farther out your brain scans for potential threats. Your ancestors didn't worry about space invaders because immediate threats got their attention. In today's world of abundance and antibiotics, your find new threats in your efforts to protect yourself.

3. Disappointment feels like a survival threat.

Disappointment triggers cortisol. A lion surges with cortisol when the gazelle it is chasing gets

away. The lion is hungry and must find something fast to have the strength needed to catch its prey and protect its kill from hyenas. The bad feeling of cortisol tells the lion to give up on this chase and find a better prospect, despite its hunger. The cortisol of disappointment protects a critter from wasting energy on paths that don't lead to rewards.

Your cortisol surges if you fail to get the pony you wanted for Christmas. You know it's not a survival threat, but cortisol makes it feel that way. When you fail to get the reward you seek, cortisol tells you to stop investing energy in a failed chase and find a better prospect. Sometimes that signal is wrong. You persist instead of giving up if your cortex finds promising evidence. But sometimes you are on the wrong track and it's better to make a change. Cortisol helps you do that. It's nice to have two brains working together!

But life with two brains is complicated. When a lion is hungry, it is less able to compete for mates and protect its children. Its genes could be annihilated from the face of the earth. The lion isn't thinking that, of course, but any threat to a mammal's "reproductive success" is a threat to its

survival. This triggers cortisol even when a mammal appears to be big and strong.

A bad hair day triggers cortisol because your brain links it to your "reproductive success." You are not consciously trying to spread your genes, so you find it hard to explain the big cortisol surge. You assume something is really wrong.

Social disappointments get a big response from the mammal brain because they have big relevance to the survival of your genes. A monkey's cortisol surges when it sees a bigger monkey next to the fruit it was climbing toward. Cortisol tells the monkey to back off to avoid pain. Without the fruit, the monkey's hunger continues and its reproductive prospects fall. So even though it's just a tiny disappointment, cortisol gives it a life-or-death feeling.

You can see how this works with humans. When someone else gets a reward you had your eye on, your cortisol is triggered. It may be something small and your verbal brain insists you don't care, but cortisol creates a full-body sense of threat.

How to Make It Stop

It's useful to know that cortisol has a half-life of twenty minutes. That means half of it will be gone in twenty minutes, and half of what's left is eliminated in another next twenty minutes. In an hour, most of it is gone— unless you trigger more. And that's the problem. We tend to trigger more because cortisol tells you to look for threats, and you find them when you look.

When you see evidence of threat, you feel sure it's real because the bad feeling tells you so. You can end up in a bad loop, where more evidence triggers more cortisol which triggers more evidence and more cortisol.

People tell you to relax.

Imagine yourself on a tropical island. It's easy to see why this doesn't work. When you feel like a predator is chasing you, lying on a beach doesn't feel safe. The way to feel safe is to do what a gazelle does: focus on your next step. A gazelle would not survive if it focused on the lion. It focuses on the path in front of it, and its own action steps. When you focus on the path in front of you and your own action steps, you give your inner

mammal the message that you will soon be back to the pleasure of meeting your needs.

When a gazelle succeeds at escaping, it doesn't think, "They're still out there so it's hopeless." It doesn't ask "why do they want to eat me?" It doesn't refuse to go out until the world is perfect. A gazelle doesn't have enough neurons to trigger thoughts internally. It sticks to the circuits triggered by its senses.

We humans have enough neurons to worry. We can imagine predators that are not actually there. We can imagine problems with every possible escape path. We doubt our own skills when we take action. This ability to anticipate harm has its value, but it will flood us with cortisol if we let it. You can stop this by focusing on your next step. Here is a simple tool that you can use whenever you feel bad. It only takes twenty-two minutes. You can practice it daily so it will come to you naturally in a cortisol moment.

1. For one minute:
Ask yourself what you want right now. Frame your answer in terms of dopamine, serotonin, and/or

oxytocin, because that is what your inner mammal wants. It feels safe when you acknowledge its needs and confidently step toward them. You can't always get what you want, but you can always take a next step. Define a practical goal and break it down into small steps. Target steps within your power instead of making others responsible for your steps.

2. For twenty minutes:
Do something fun to give your cortisol time to metabolize. Find an activity you enjoy that doesn't hurt you in the long run. Design ways to access your soothing activity wherever you are. You could build a portable arts and crafts kit. Or make music with a mini keyboard or guitar emulator. Or load comedy recordings onto your phone and listen while walking up and downs stairs. Keep your mind and body busy to avoid triggering more cortisol. It's hard to take your next step while cortisol is surging because you only see the bad side of things. But don't wait too long. Set a timer for 20-40 minutes. Then move on to Step 3, because you need to take action to feel safe.

3. For one minute:
Take your next step. You may object that you lack the money and power, and a minute is not enough. But when you are telling yourself there's nothing you can do, you feel like a trapped animal. Instead, find a step you can take, and either start now or spend a minute writing a plan into your calendar. Break your dreams down into small chunks and act on the first chunk by the end of the day. Tomorrow you will tackle another chunk. Taking steps shifts your focus from threats to rewards.Your happy chemicals flow because your inner mammal expects its needs to be met.

Why Bored Feels So Bad

Being bored feels awful because of cortisol. Why would boredom feel like a survival threat? Because our ancestors needed constant action to survive. They would have died if they stopped stepping toward rewards. When you stop taking steps, your inner mammal sees it as a survival threat.

So why aren't you taking steps?

You don't want to get disappointed.

Your inner mammal doesn't want to waste energy on failed chases. You want to be sure of success before you take that step. But nothing looks sure. You see potential threats in every possible path. The threats triggers your "do something" feeling, but you don't know what to do.

The mammal brain constantly choosing its next step. It looks for its best opportunity to reach rewards and avoid harm. Each mammal decides this with expectations built from its past experience. If a lion expected to fail in every chase, what would happen to it? It would get so hungry that it would try, despite the risk of failure. The risk of starving would outweigh the risk of disappointment. It might fail anyway, but it would gradually build its skill.

You do not risk starving. A pizza delivery is never far away in the modern world. If the worst threat you face is disappointment, you avoid that threat by waiting for the perfect opportunity. You wait and wait. You endure the cortisol of boredom because you fear the cortisol of disappointment.

The Joy of Relief

Relief is the great moment when a gazelle realizes it has escaped a predator. Nothing feels better than relieving cortisol because nothing promote survival more. This is why so many people have unhealthy stress-relief habits. They get short-run relief, so they ignore the bad long-run consequences. When you see someone else's bad habit, the danger seems obvious. But when it's your bad habit, it looks different. Let's see why.

Imagine you're a baboon being chased by a lion. You climb up a tree and enjoy the surge of dopamine that says you're safe. This wires your brain to scan for trees the next time you smell a threat. The instant you see a tree, a joy of relief starts flowing and you run toward it.

Now let's explore the human equivalent. Imagine you get a bad grade on a math test. You walk out of the classroom and run into a friend who invites you to a party. You engage in a harmful behavior at the party and you completely forget about the test while you're doing it. From your mammal brain's perspective, you have escaped the threat. Partying feels like a lifesaver, even if you consciously know

better. The great feeling wires you to look for another party the next time you get a bad grade.

Fortunately, you have a human cortex that can think about the long run. It knows that the threat is still there until you actually study. You can enjoy the great feeling of relief by studying! It doesn't work immediately, however. You have to study every day and the relief doesn't come until the test is over. But if you do that a few times, you build a new neural pathway that expects relief. Then the good feeling starts to flow as soon as you start studying because your inner mammal expects the reward.

But you may already have wired yourself to relieve threatened feelings in another way. Maybe it's not partying. Maybe it's just a thought loop, such as: "I'm going to get disappointed so I'm not going to try." This relieves cortisol immediately in that moment when you are about to try. Of course, your human brain knows this doesn't bring rewards in the long run. That thought triggers more cortisol. How do you respond to that cortisol. Maybe you fall back on the circuit you already have: you tell yourself "I'm going to get disappointed so I'm not going to try."

It's not easy being mammal!

But when you know how your brain works, you can rewire yourself to feel good in new ways.

You cannot feel good every minute of every day. That's not how our brain works. When you know that droops are natural, you stop seeing them as survival threats. You allow them to pass instead of getting into a cortisol spiral.

Ups and Downs Are Natural

You will not be able to stimulate happy chemicals constantly. And each time you stimulate them, they're metabolized and gone in a few minutes. Then you have a little droop.

When you're in a droop, cortisol gets your attention more easily. Bad thoughts get your attention when there's no happy-chemical surge to mask them. You don't have to see this as a crisis. You can see it as nature's way of trying to protect you. Your brain is just trying to warn you of every possible thing that could go wrong, using the circuits built from your past experience with things going wrong.

No one's circuits are perfect guides to reality. We all live with ups and downs. And we all have the capacity to explore new territory despite the risk of things doing wrong. You have billions of unused neurons in your brain. You can find new ways to feel good regardless of how you're wired.

No one can do it for you.

You can do it for yourself, regardless of what anyone else thinks or does.

There is no one right way to do it. Each brain will carve new trails starting from where it is.

You may have gotten the idea that life is guaranteed flow of happy chemicals. The people who gave you this idea may have good intentions. They also have their own reasons for wanting you to feel good. They are struggling to manage their inner mammal too. But you can't manage their brain and they can't manage yours. What you can do is soothe your inner mammal by showing it that you can meet your survival needs. The urge to make others happy is strong, of course, and we'll address later chapters.

But how can I meet my survival needs, you may ask? The following three chapters show you how in the context of three major frustrations of daily life: popularity, tests, and attractiveness. You may not

think of these frustrations as “survival needs.” You may hate to think about them at all. Yet your inner mammal thinks of them a lot! Let’s see why it cares so much, and how you can navigate these challenges with more happy chemicals and less cortisol.

You have inherited your brain from ancestors who survived. It’s a miracle when you think about it because survival rates were low in the past. Many children died before they reproduced, but every one of your ancestors succeed at surviving long enough to reproduce, going all the way back. You are descended from survivors! You have inherited a brain designed to promote survival. Managing that brain is not easy. It’s the challenge that comes with the gift of life.