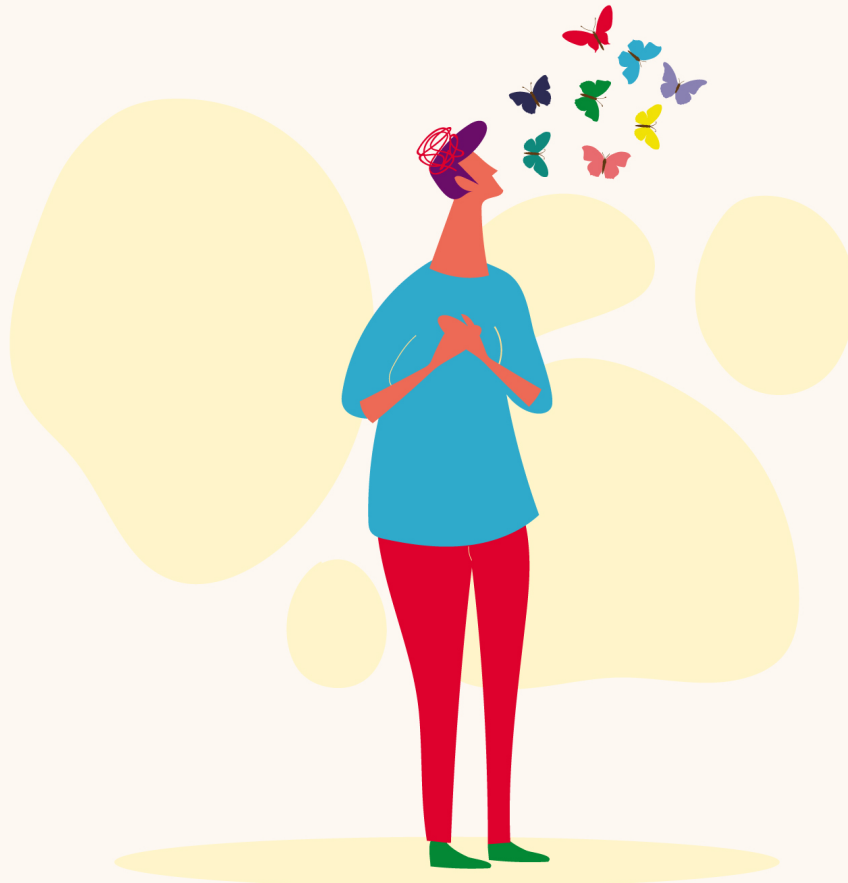


# SUMMARY

## HOW EMOTIONS ARE MADE

LISA FELDMAN BARRETT



# **Summary of “How Emotions Are Made” by Lisa Feldman Barrett**

Written by Lea Schullery

Learn About the Secret Life of the Brain

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# Introduction

In times of tragedy, humanity finds themselves responding in similar ways: with heartfelt emotions and tears. For example, on December 14, 2012, one of the deadliest school shootings in U.S. history took place at Sandy Hook Elementary School in Newtown, Connecticut. The tragedy claimed the lives of twenty-six people, including twenty children, all of whom were massacred by a lone gunman. Weeks later, the governor of Connecticut, Dannel Malloy, gave his annual “State of the State” speech on television. During it, he mentioned the two brave souls who risked their lives to protect their students. As the governor spoke the words, “protecting students,” his voice caught in his throat. The author, Lisa Feldman Barrett, immediately felt the emotions pour over her and her eyes began to flood. As the camera panned to the crowd, the author noticed other people beginning to sob as well. Governor Malloy eventually had to pause and turn his gaze downward. Many people believe these emotions are simply hardwired into us, a reflex. When triggered, we believe that emotions like sadness simply unleash themselves the same way it does in all humans. In other words, all of our sadness is the same. Modern science considers this view of emotions as the *classical view*. According to this view, our emotions are a fixed part of our biological nature. They are universal as people of every age, culture, and place experience emotions in similar ways. While hundreds of experiments provide evidence for the classical view, *hundreds more* cast that evidence into doubt. Instead, Lisa Feldman Barrett aims to prove that our emotions are not what we think they are. She aims to answer the questions, “How are emotions made if they aren’t triggered reactions?” “Why do they vary so much?” Throughout this summary, you’ll find out the answers to these questions and discover exactly how *emotions are made*.

# Scientific Evidence Against the Classical View

When Dr. Barrett was a Ph.D. student at the University of Waterloo, she began experiencing her first doubts about the *classical view* of emotions. In her first experiment, she researched the roots of low self-esteem and its links to anxiety and depression. Research shows that people feel depressed when they fail to live up to their own expectations; meanwhile, they feel anxious when they fall short of the expectations set by their peers. So Dr. Barrett aimed to test these well-known hypotheses. Ironically, she discovered that none of her volunteers reported experiencing anxiety or depression when expected.

This was only the first of *eight* failed experiments. Each time, her volunteers never felt as expected. What went wrong? Thoughts of doubt entered her mind, she found herself thinking, “*not everyone is cut out to be a scientist.*” As it turns out, these failures were the first experiments that helped Dr. Barrett prove that emotions are more complex than we believe. While the classical view of emotions has long been espoused by cerebral minds like Aristotle, Darwin, Descartes, and Freud, the same view has been accepted by modern thinkers like Steven Pinker, Paul Ekman, and the Dalai Lama.

Instead, Dr. Barrett found that while everyone uses words like “angry,” “sad,” and “afraid” to communicate their feelings, those words don’t necessarily mean the same to everyone. For instance, some people might say they experience sadness and fear as two different emotions. However, others lump together words like “sad,” “afraid,” “anxious,” and “depressed” to mean “I feel crappy” or “I feel unpleasant.” In other words, people vary tremendously in how they communicate and differentiate their emotional experiences.

According to Dr. Barrett, emotions are like colors. While an interior designer can distinguish the difference between azure, cobalt, ultramarine, royal blue, and cyan, someone else not skilled in the study of colors may

identify each of these colors as just *blue*. This phenomenon led Dr. Barrett to question, “*How can a scientist tell if someone saying they feel happy or anxious is accurate?*” In other words, how can we measure an emotion objectively? If we look at the classical view of emotions, then emotions can be accurately measured by facial expressions. But do you always make an angry face when you’re angry? Or a shocked face when you’re surprised? No. Everyone reacts to these emotions in very different ways.

So the author began experimenting. Between the years of 1990 and 2011, Dr. Barrett and other scientists at the Interdisciplinary Affective Science Laboratory analyzed the brain by dividing it into tiny cubes called voxels, the 3-D version of pixels. For each voxel in the brain, they recorded whether or not the brain experienced increased activation when experiencing a particular emotion. The results showed that there was little support for the classical view of emotion. For instance, while the amygdala showed an increase in activity for emotions like fear, it only occurred in a quarter of fear experience studies. In other words, far less than expected to believe emotion is innate, like a fingerprint.

The study also found that the amygdala also became activated when patients were feeling anger, disgust, sadness, and happiness. Even more, amygdala activity increased during non-emotional times, such as when someone felt pain, learned something new, met new people, or made decisions. Overall, they found that “*no brain region contained the fingerprint for any single emotion.*” Simply put, just because a person is smiling doesn’t mean they are happy!

But why does this matter? Well, belief in the classical view of emotions affects your life in ways you would’ve never imagined. For example, the Transportation Security Administration (TSA) once underwent a training program called SPOT (Screening Passengers by Observation Techniques) which taught TSA agents to detect deception based on facial and bodily movements. The theory believes that such movements can reveal your innermost feelings. Unfortunately, the program failed and cost taxpayers \$900 million.

# The Theory of Constructed Emotion

How do you know if you're attracted to someone? Perhaps you begin to feel flush in the face or butterflies in the stomach. Once when Dr. Barrett was in graduate school, she agreed to go on a date with a guy she wasn't particularly attracted to. She agreed, however, since she had been cooped up in the lab all day and craved some normal, human interaction. During the date, she began to feel her face flush, her stomach flutter, and she had trouble concentrating. Wow, she actually was attracted to him! But as soon as she walked into her apartment after the date, she dropped her keys and threw up. She spent the next seven days in bed with the flu.

But what does this mean? Well, Dr. Barrett believed she was feeling attraction simply because she felt the symptoms of a flushed face and butterflies in her stomach. Therefore, "An emotion is your brain's *creation* of what your bodily sensations mean, in relation to what is going on around you in the world." She calls this explanation the *theory of constructed emotion*. In other words, emotions are created spontaneously and concurrently in many areas of the brain. And each emotion is based on any given individual's experience.

For instance, if a swarm of buzzing bees is aggressively making its way into your home, you might begin to feel anxiety or fear because of your brain's knowledge of stinging insects. On the other hand, someone might see a picture of a smiling cartoon bee in a children's book and be reminded of their beloved niece who they took to a Disney movie; suddenly, that person becomes flooded with nostalgia. In other words, emotions are not your reactions to the world. Instead, your brain constructs meaning and prescribes action from sensory input and past experience.

The theory also suggests that our emotions *vary*. Perhaps when you are feeling angry you scowl, or maybe you frown, shout, laugh, or simply stay calm. That's because there is no single "anger," anger varies which means your reaction varies as well to fit what works best for the situation. In fact,



emotion categories are like cookies. You have crisp ones, chewy ones, sweet ones and savory ones, large, small, flat, rounded, floured, flourless, and countless more. Cookies don't need to look the same or be created with the same recipe but each serves the same purpose of providing a delicious, tasty treat or dessert. Similarly, each category of emotion like "happiness" or "guilt" is filled with variety. Similarly, if emotions are like cookies then your brain is like the kitchen full of the ingredients necessary to make various foods like cookies, bread, and muffins. With these ingredients, you can create diverse foods; likewise, your brain has core ingredients that make up your *core systems*.

These ingredients in your brain combine in complex ways and produce diverse feelings of happiness, sadness, anger, fear, and more. This theory also works in the same way that Charles Darwin's theory of evolution helped to argue against the concept of "biological essences." Those who believed in "biological essence" believed each species was a fixed set of traits and attributes. However, Darwin proved that each species is a population of individuals, each one varies depending on its environment. Similarly, our emotions are not fixed; we construct them from our own histories and personal experiences.

# The Interoceptive Network and Your Brain's Predictions

When was the last time you were truly filled with pleasure? Not necessarily sexual pleasure but an everyday delight like sipping a cold drink on a sweltering hot day or enjoying some peace after a stressful day. Now contrast that feeling with something unpleasant, like being sick with a cold or getting in an argument with a friend. The two feelings are quite different, right? That's because feelings come from an ongoing process inside of you called *interoception*. Interoception is the brain's representation of what's going on inside your body - its hormones, immune system, and nervous system. As you sit there, your body is in motion. Your heart sends blood, your lungs fill and empty, and your stomach digests food. This interoceptive activity is the basis of your emotions and is the core ingredient in creating them.

Your interoceptive sensations are the origins of your most basic pleasant, unpleasant, calm, and jittery feelings. To understand why we are going to look at your brain's perspective. Think about your brain for a moment, it cannot jump out your head and experience the world directly; instead, it must understand the world via scraps of information from light, vibrations, and chemicals that become sights, sounds, smells, and more. As a result, your brain tries to establish the meaning of those flashes and vibrations, and its main clues are your past experiences. So while your brain is trapped inside your head, your brain uses your past experiences as a guide to making *predictions*.

These predictions are simply neural conversations that try and anticipate every sight, sound, smell, taste, and touch that you will experience as well as each action you will take. "These predictions are your brain's best guesses of what's going on in the world around you, and how to deal with it to keep you alive and well." This interoceptive network is made up of two regions, the first is the *body-budgeting region*. This is what we mentioned previously about your body predicting your movements based on your past

experiences. For instance, this region might instruct the adrenal gland in your kidney to release cortisol when you need a boost of energy.

The second region is called the *primary interoceptive cortex* which represents the sensations inside your body, like the pounding feeling in your chest. Together, these two regions regulate your *body budget* which controls your body's resources like glucose, cortisol, and heart rate. So why is all this important in the first place? Well, your emotions are stimulated by the state of your body budget. Overall, "your interoceptive network controls your body, budgets your energy resources, and represents internal sensations, all at the same time." However, withdrawals from your body's budget don't mean you have to be moving, your brain can predict when your body needs energy and make a withdrawal by releasing cortisone and glucose into your bloodstream.

For example, Dr. Barrett and her team were once evaluating a portable device that monitored the heart. Whenever the wearer's heart rate sped up 15 percent above normal, the device would beep. One of her graduate students was once wearing the device as she worked at her desk where the device remained silent; however, as soon as Dr. Barrett (her Ph.D. advisor) walked into the room, the device beeped loudly! Later in the day, Dr. Barrett wore the device herself and found that it beeped several times while receiving emails from a granting agency. So when something as simple as seeing your boss, teacher, or coach walk into the room, your brain predicts that your body needs energy, thus making the withdrawal.

# Affective Valence and Arousal

When you wake up in the morning, how do you feel? Do you feel refreshed? Crabby? In the middle of the day, do you feel dragged? Full of energy? These feelings are what scientists call *affect*. Affect is the general feelings you experience throughout the day. It's not technically an emotion but simply how pleasant or unpleasant you feel, which scientists call *valence*. When you feel the sun on your skin or the discomfort of a stomachache, these are all examples of *affective valence*. Affect also has a second feature which is simply how calm or agitated you feel, this is called *arousal*. These feelings can be the anticipation of receiving good news or fatigue after a long run.

Philosophers describe valence and arousal as basic features of human feeling and are emotions that become present at birth and stay with you for life until death. Additionally, affect depends on interoception and is a constant current in your life, which means it doesn't turn on and off in response to events you find emotional. In other words, affect is an aspect of your consciousness. Therefore, when your brain experiences interoceptive changes, you experience pleasantness and unpleasantness, and agitation or calmness. Furthermore, interoception is simply the fundamental feature of the human nervous system and helps regulate your body budget. "It helps your brain track your temperature, how much glucose you are using, whether you have any tissue damage, whether your heart is pounding, etc. So when you feel flushed or overdrawn, you may need a deposit in your body budget."

If your budget is unbalanced, your affect doesn't instruct you how to act; instead, it causes your brain to search for explanations. Using past experiences, your brain is constantly trying to predict which objects and events will impact your body budget, thus changing your affect. These objects and events are called your *affective niche*, which includes everything that is currently impacting your body budget at any present moment. Psychologist James A. Russell developed a way to easily track the

affect. When you are simply sitting quietly, your affect is at a central point of “neutral valence, neutral arousal.” If you’re at a party having fun, you might be in the “pleasant, high arousal” point. After the party, your affect might turn to “unpleasant, low arousal.” Throughout the day, your brain travels through this affective map but you don’t even have to do anything to travel. In fact, when you daydream, you take yourself on an affective adventure and your brain swirls with affect.

So why does any of this matter? Well, affect can have far-reaching consequences beyond simply feeling pleasant or unpleasant. Imagine a judge listening to an inmate’s story and hearing about his behavior in prison. The judge must decide whether or not to grant the prisoner parole, and while the inmate has proven stellar behavior in prison, the judge still has a *bad feeling*. The judge has a hunch that he needs to keep the prisoner locked up; otherwise, he may hurt someone else. The judge denies parole. This *bad feeling* is an example of *unpleasant affect* but how accurate is it? Can your affect mislead you? Well, this exact scenario was the subject of a 2011 study in which scientists studied the decisions judges made. Scientists found that judges were significantly more likely to deny parole to a prisoner if the hearing was just before lunchtime. Meanwhile, the judges began granting parole after lunch with customary frequency.

Simply put, when you experience affect without knowing the cause, you are likely to treat affect as information about the world, rather than your experience of the world. In fact, psychologist Gerald L. Clore aims to study why people make decisions on everyday gut feelings. He called this phenomenon *affective realism*. For instance, when interviewing for a job, those interviewed on rainy days were likely to be rated more negatively than on sunny days. Therefore, when we receive *bad feelings*, we probably aren’t experiencing any wrong, but simply a depletion in our body budget. In fact, affective realism has been known to have tragic consequences. In July 2007, an American gunner aboard an Apache helicopter in Iraq mistakenly killed a group of eleven unarmed people, mistaking a journalist’s camera for a gun. Similarly, affective realism may also play a role in police shootings of unarmed civilians.

Of course, many factors can attribute to these tragedies, anything from carelessness to racial bias, but affective realism in high-pressure, dangerous situations can cause shooters to perceive a weapon when none is present. “The human brain is wired for this sort of delusion, in part because moment-to-moment interoception infuses us with affect, which we then use as evidence about the world.”

# Emotions in Cultural Concepts

How would you describe anger? Or even sadness? Many Westerners are surprised to know that Utka Eskimos have no concept of “anger,” but even more shocking is the Tahitians who have no concept of “sadness.” A life without sadness? How is that even possible? Well, when Tahitians are in a situation that Westerners would describe as sad, they feel ill, troubled, fatigued, or unenthusiastic, all of which are part of their broader term *pe’ape’a*. In fact, different cultures may even argue what “emotion” is. While Westerners believe emotions to be experiences that occur inside an individual, many other cultures characterize emotion as an interpersonal event that requires two or more people. This includes the Ifaluk of Micronesia, the Balinese, the Fula, the Samoans, the Pintupi Aborigines of Australia, and more.

So what does this mean exactly? Simply put, it shows that we construct our reality based on the concepts we learn through our environment, which largely depends on our culture. If we go back to our food analogy, we can explain further with the muffin-cupcake debate. For example, the two are essentially the same thing: flour, sugar, shortening, and salt. In fact, based on the chemistry of the two, you cannot tell the difference; however, one is a breakfast food and the other is a dessert. Why is that? The difference isn’t physical, it’s culture. The muffin-cupcake distinction is *a social reality*: when physical objects, like baked goods, take on additional functions by social agreement.

Likewise, emotions are social reality. A physical event like a change in heart rate, blood pressure, or respiration all become emotional experiences when we imbue the sensations with additional functions we have learned from our cultures. For instance, when we see a friend widen their eyes, we assume he is feeling fear or surprise. In other words, we tend to confuse physical reality, like a change in heart rate and widened eyes, with the social reality of emotion concepts. Emotion concepts are simply formed by cultural convention. This can be proven through the history of smiling. You

see, today we equate smiling with happiness; however, the historical record shows that Greeks and Romans didn't smile spontaneously when they were happy. The word "smile" doesn't even exist in Latin or Ancient Greek. It simply became an invention in the Middle Ages when dentistry in the eighteenth century became more accessible and affordable.

A classics scholar, Mary Beard, further writes that while smiling wasn't in the dictionary, that does not mean that Romans never curled up the edges of their mouths. Of course they did! But the curling of the mouth didn't mean much in the realm of social or cultural gestures. Similarly, they likely expressed other gestures that would mean nothing to us today.



# Learning Begins at Birth and Never Stops

So where do emotion concepts even come from? For instance, how can a concept like “awe” have such diversity? We can be awed by the vastness of the universe or awed by Erik Weißenmayer who scaled Mount Everest while blind. We can even be awed by the tiny worker ant that can carry five thousand times its body weight! According to the classical view, we are born with concepts like “awe,” like a fingerprint. However, infants show no evidence of being born knowing “awe.”

That’s because the newborn brain undergoes a process called *statistical learning*. Think about it. As soon as you are immersed in this strange new world as a baby, you are immediately bombarded with noise and your tiny brain begins interpreting the different sights, sounds, smells, touches, and tastes. Naturally, infants have an affinity for speech and they pay particular attention to the sounds of syllables and words. Immediately, the learning process takes over and babies become hardwired for their native languages. Babies then use statistical learning to make predictions about the world and guide their actions.

Psychologist Sandra R. Waxman demonstrated the power of words in infants as young as three-months-old. Infants were given pictures of different dinosaurs while the experimenter spoke a made-up word, “toma.” Later, those same infants were able to correctly identify which pictures depicted a “toma.” On the other hand, infants that were given audio tones versus human speech could not make the same distinction. Therefore, spoken words give the infant brain access to information that cannot be materialized by simply observing the world, including emotion concepts.

For instance, author Dr. Barrett thought about how her daughter Sophia may have learned emotion concepts when she was an infant. She would tell her daughter, “Sophia, sweetie, are you angry? Don’t be angry, honey, you’re feeling angry.” At first, these words must have simply been noise, but over time, the word “angry” invited her daughter to search for other ways in

which she felt angry, even if it wasn't the same. Simply put, Sophia eventually formed a rudimentary concept about anger based on the constructed experiences her parents introduced to her. Of course, this learning doesn't stop once the child can understand emotions like anger, it's an ongoing process. Sometimes a new emotion word appears in your primary language that didn't exist before. For example, the German word, *schadenfreude*, is an emotion word meaning "pleasure from someone else's misfortune" which has now been incorporated into the English language.

Since learning is an ongoing process, we can learn to open ourselves up to new experiences and new emotion concepts. As a result, we can learn better how to distinguish the differences between emotions and better learn how to respond and react.

## Final Summary

While the classical view of emotion believes that emotions are innate in humans since birth, new science and research prove this to be untrue. Instead, emotions are a reality that is constructed through our experiences and culture. Infants, for instance, aren't necessarily born with emotions like "awe," and "disgust." Instead, our basic emotions are pleasant, unpleasant, calm, and agitated. We can see this in infants as they either cry out of anger or calmly observe the world around them. It isn't until our experiences and language teach us about other emotions like anger, disgust, and surprise, that we begin to construct our own ideas and beliefs about feelings. In fact, we construct these ideas throughout our lives and we never stop. Luckily, as we experience new experiences, we begin to better identify our emotions and become well-rounded individuals. In the end, Dr. Barrett asks that you open your minds and construct a new reality about emotions, she states, "Like most important paradigm shifts in science, this one has the potential to transform our health, our laws, and who we are."



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