

The Inside Story

Understanding the Power of Feelings: The Heart-Brain Connection

The Inside Story is filled with vital information for the healthy behavior and well-being of adolescents and adults. Based on the latest research in neuroscience, this thirty-two page booklet explains, in simple terms, the connection between emotions and heart-brain physiology. Readers will understand the interplay between their bodies, mind, emotions, and performance. Included are several reflective activities and an easy-to-use technique for transforming daily stress.

Go to www.heartmath.org for information
on research and support materials.

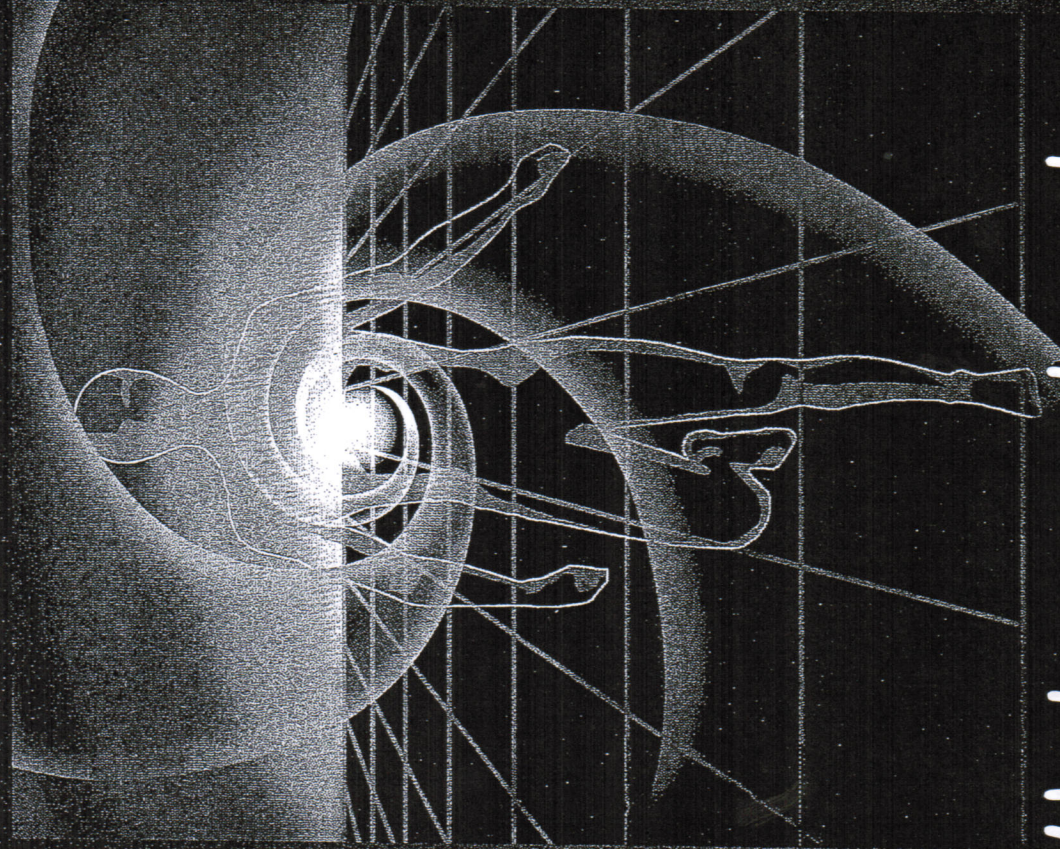
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The Inside Story

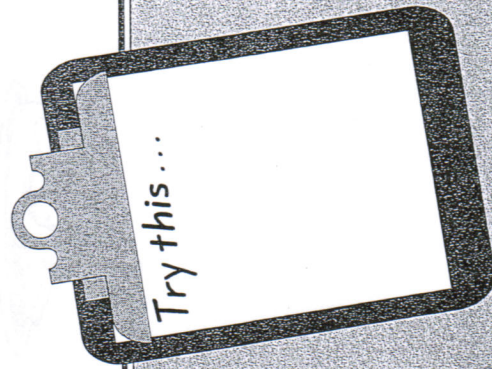


Understanding the Power of Feelings:

The Heart-Brain Connection

You can gain tremendous benefits once you recognize that your emotional memories are affecting you and, in many cases, controlling and limiting you. When you realize this, you can begin to reduce these inappropriate fears, anxieties, angry reactions, and other unhealthy emotions caused by emotional memories. One effective tool is the Freeze-Frame® technique taught in this booklet. This tool can help you deal with emotional memories from a more objective perspective and with increased balance between the 1st, 2nd, and 3rd brains.

As you will learn later in this booklet, the heart is involved in how we feel and how well the different brain levels can talk to each other. The heart and brain communicate with one another and the messages they send back and forth affect us in many important ways. But before we explain this further, you need to know a little bit about the nervous system—the pathway through which these messages travel.



- ▶ Ask two friends to tell you where they were and what they were doing when they first heard about the terrorist attack on the World Trade Center.
- ▶ Then ask them to tell you what they ate for lunch three days ago.

They may find it is easier to remember the first fact than the second. Why? It's because their emotional reaction to the attack on the World Trade Center was significantly stronger than their experience at lunch.

4 Emotions and the Nervous System

You can think of the nerves in your body as wires that carry electrical signals from one part of the body to another. For instance, nerves carry information from the eyes, ears, nose, and other parts of the body to the brain, so that we can perceive the world. This group of nerves is called the *sensory* portion of the *central nervous system*. The central nervous system also carries the signals from the brain to the body so that we can walk, talk, and do all the things we do. This group of nerves is called the *motor system*. It is the motor system that we have conscious control over.

Another major part of the nervous system is called the *autonomic nervous system*. It operates at a *subconscious* level (without our being aware of it) and controls many of the functions of the internal organs and the glands, which secrete *hormones*. The autonomic nervous system is also very much involved in our ability to feel and experience emotions.

Exciting new research has recently challenged several longstanding assumptions about emotions. For years psychologists maintained that emotions were purely mental expressions, generated by the brain alone. We now know that this is not true. Emotions have as much to do with the heart and the body as they do with the brain. Emotions are produced by the brain and body acting together. Today the idea of separating the brain from the body is rapidly becoming out of date. It is the autonomic nervous system that connects the brain, heart, and body.

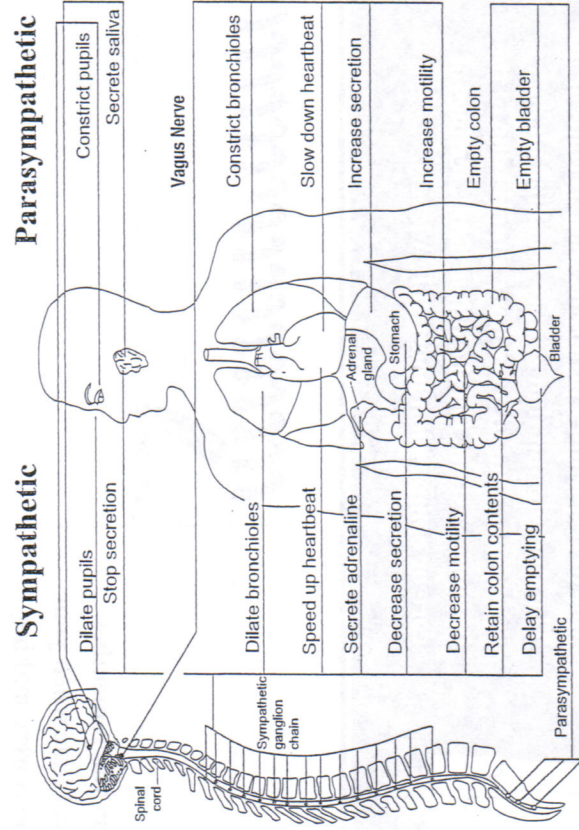
The picture on the next page shows how the autonomic nervous system affects different organs or bodily functions, utilizing two branches of nervous system activity.



It is the autonomic nervous system that connects the brain, heart, and body.

One branch is called the *sympathetic nervous system*, which prepares the body for action by speeding up the heart rate—it can be compared to the gas pedal in a car.

The other branch, the *parasympathetic nervous system*, can be compared to the brake pedal in a car because it slows the heart rate. **For example** . . . when we run or exercise, the sympathetic nervous system speeds up the heart rate. When we rest, the parasympathetic nervous system helps slow the heart rate down.



This diagram shows how the autonomic nervous system regulates different organs or bodily functions. A number of health problems can arise in part due to improper function or balance in the autonomic nervous system. For example, anger causes activity in the sympathetic system to increase and activity in the parasympathetic system to decrease. If a person is angry or stressed a lot of the time, an imbalance develops in his system, which can lead to high blood pressure and heart attacks.

Different emotions cause different messages to be sent through the nervous system to the heart, face, and body. In the research laboratory, one of the easiest ways to see how different feelings and emotions affect the nervous system is to look at how the heart speeds up and slows down. The changes in the heart's rhythms reflect the activity in the branches of the autonomic nervous system.

Emotions like frustration, anger, anxiety, or worry can cause signals going down the two parts of the autonomic nervous system to get out of sync with each other. This can be likened to having one foot on the car's gas pedal (the sympathetic nervous system) and the other on the brake (the parasympathetic nervous system) at the same time—this creates a jerky ride and burns more gas. Just as it would cause extra wear and tear on the car, the same process also causes stress in our bodies. It depletes our energy and interferes with our ability to think. Many people call emotions that lead to this inner disorder “unhealthy” or “negative” emotions because of the harmful effects they have on our bodies and health, especially when experienced often. Everyone has negative emotions occasionally, and we can learn from them, but over time having too many of these emotions is not healthy. For our happiness and well-being it's important that we become aware of our feelings and take charge of our emotional experiences.

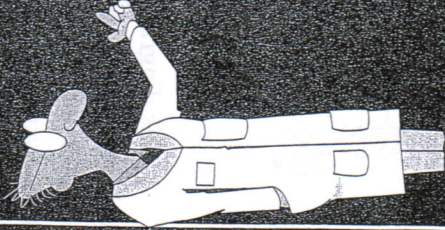
Research shows the following consequences of unhealthy emotions.

- ▲ Less ability to think clearly
- ▲ Less efficiency in decision-making
- ▲ Less ability to communicate clearly
- ▲ Reduced physical coordination
- ▲ Higher risk of heart disease
- ▲ Higher risk of high blood pressure



DID YOU KNOW?

Anger suppresses your immune system. In a recent study, researchers asked healthy individuals to focus on two different emotions—anger and care—while a key *immune system antibody, secretory IgA*, was measured. IgA (*immunoglobulin A*) is the first line of defense in the immune system, acting as a protective coating for the cells against invading bacteria or viruses. Stress is known to decrease IgA levels, leaving us more vulnerable to respiratory problems such as colds or flu. The study found that simply recalling an angry experience caused a six-hour suppression of the immune system. On the other hand, feelings of care or compassion boosted IgA levels.



- Can you remember a recent time when your emotions were making it hard to think clearly—or made you feel physically sick? Write about how you felt and what happened.



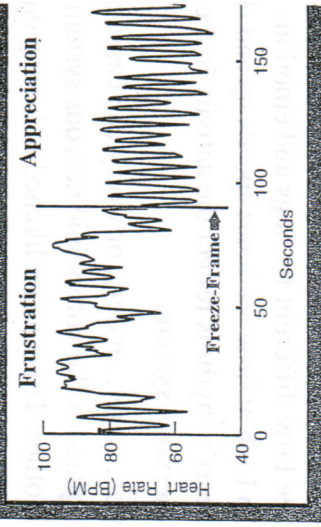
When we feel uplifting emotions, such as appreciation, care, and compassion, the signals sent through the nervous system are very different from the signals sent when we are feeling upset. These emotions allow the two branches of the nervous system to get in sync with each other. Then the body's glands and organs work together in harmony and the heart's rhythms become smooth and even. Thinking clearly, making better decisions becomes easier. This is why emotions such as appreciation, care, and compassion are called "healthy" or "positive" emotions.

Do positive emotions just happen to us—are they random—or do we choose to create them? At times, when we are with friends or doing something fun, we just feel good. At other times, finding a positive emotion could feel as likely as discovering water in the desert. But, in practice, you can learn to create positive feelings yourself. Then you don't have to be a victim of emotional memories, circumstances beyond your control, or "a bad hair day." These skills are valuable. Research now says that learning to handle your emotions can make a big difference in whether or not you are successful in life. In fact, it can have a more important influence on your success than your I.Q.!

Research shows the following consequences of healthy or positive emotions:

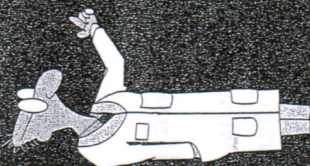
- Improved performance and achievement
- More creativity and innovative problem-solving
- Better decision-making
- More flexibility in the way you think
- Improved memory
- Improved immunity to disease
- Improved hormonal balance
- Longer life span

After you learn the Freeze-Frame technique, you will be able to shift your emotions and your heart rhythms, as shown in the diagram.



► Make some notes about a time you felt uplifting emotions.

Did you notice that you felt calmer or more confident about your thinking and decision-making?



DID YOU KNOW?

The human face is a remarkable system consisting of 44 separate muscles; four are devoted to chewing and 40 to facial expression. One group of muscles is usually activated by positive feelings and another group by negative feelings.

Your facial muscles respond naturally without your conscious choice. It's an important way that people sense what you're feeling. You can try to cover up your feelings, but it's hard to do. As you know, it's easy to recognize an insincere smile.

Really good actors learn to generate the true feelings involved in the roles they play. Then their feelings are naturally reflected in their facial expressions and their acting has the power to move us.

5 The Heart-Brain Connection

There is a nervous system pathway that carries signals from the heart to the brain, as well as one that carries messages from the brain to the heart. Surprisingly, the heart sends *more* signals to the brain than the brain sends to the heart!

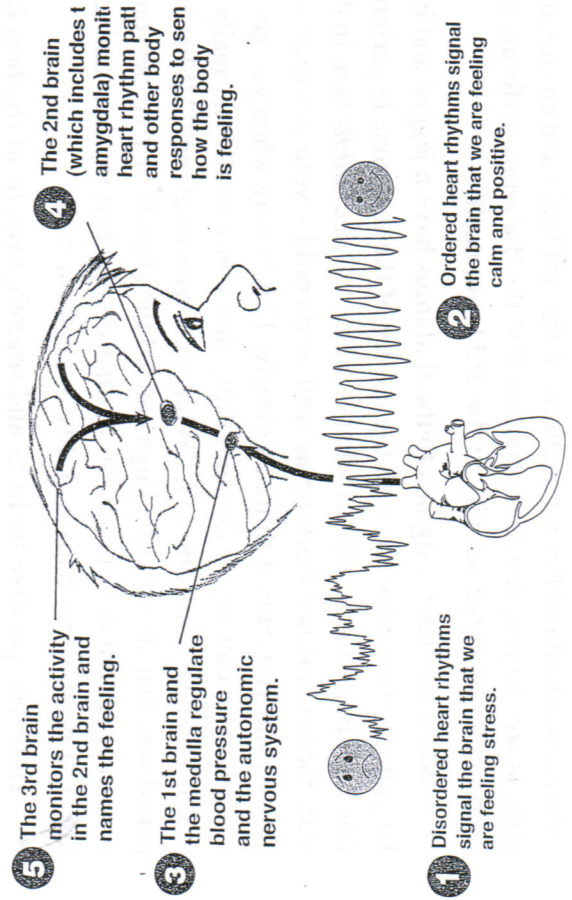
In a way, we could say that the heart and brain “talk” to one another—and together they “talk” with the body. The signals they send whether harmonious or chaotic, can make all the difference in how we feel and act.

Nerve impulses from the heart are received first at the 1st brain level, then move into the brain’s higher centers (2nd and 3rd levels), affecting how we feel, think, perceive, and perform.

Jagged and irregular heart rhythms send a message to the brain that indicates we are upset. On the other hand, smooth, harmonious heart rhythms send a signal to the brain that tells it everything is OK and working in harmony.

How Heart Activity Affects How We Feel

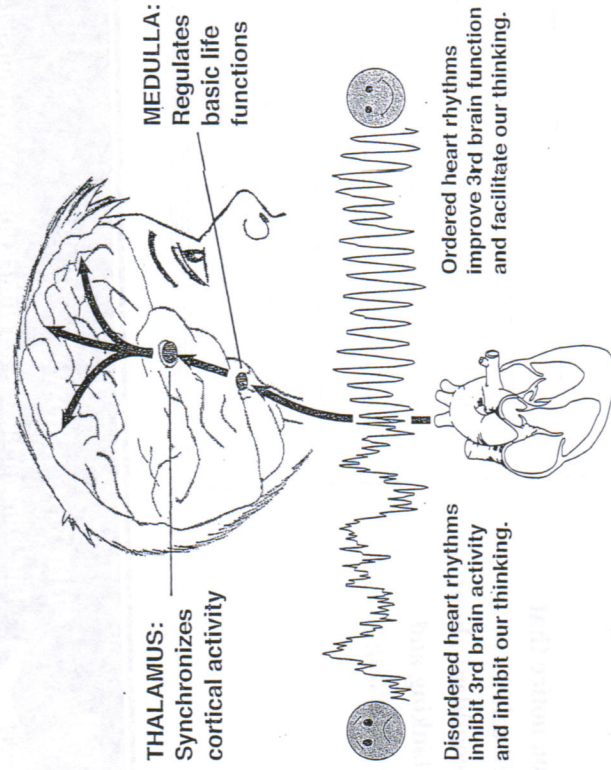
(Read in order of the numbers)



These messages are sent through the nervous system pathway that is shown on page 23. The pathway starts in the heart and goes to the 1st brain, then to the amygdala in the 2nd brain. The pattern of the signal tells the 2nd brain what the heart and body are experiencing, while the 3rd brain monitors the 2nd brain and categorizes and names the feeling of fear, anger, joy, appreciation, or whatever it is—after we're already experiencing it.

When we pretend to breathe through the area of the heart and generate a positive feeling—appreciation, for instance—we can actually change the signals the heart sends to the brain, influencing the brain's perception and improving how we feel. This signal affects how the brain perceives and is an important way that the heart influences how we are feeling.

How Heart Activity Affects Our Ability to Think



Another important pathway, shown above, is mainly related to the activity of the 3rd brain and our ability to think clearly. It carries information from the heart to the *thalamus*, a key brain center that has many crucial roles. One of its roles is to distribute incoming sensory

information to the different sections of the 3rd brain and ensure the signals are in sync. Another function that the thalamus performs is help synchronize the activity in the 3rd brain itself.

When the heart's signals to the thalamus have a jagged and irregular pattern, they interfere with the ability of the thalamus to perform this function. This results in what is called *cortical inhibition*. In that state the brain is not working as well as it could—your reactions are slowed and you cannot think as clearly. This is why when you get upset, you can say or do something that you wouldn't normally or do. You hear someone say, "What were you thinking?!" What happened was that stressful feelings caused the signals in your nervous system to get out of sync, creating disordered heart rhythms and reducing your brain's and body's ability to perform well.

However, positive feelings and smooth, even heart rhythms facilitate or improve the brain's ability to process information; this is called *cortical facilitation*. This means that our physical reflexes are faster and we can think more clearly. We can see more options and solutions to problems and situations than we could before. This is important only for tasks that require us to be able to focus, think, and make decisions, but also for ones that require us to have good coordination and speed—in sports, for example.

If we get upset while playing sports, not only do we drain our energy reserves more quickly, but our ability to perform is affected as well. This is because of the disorder caused in the nervous system by feelings like frustration, worry, and anxiety, and also because of the "noise" they create in the brain. An excess of mental and emotional noise in the brain can make it difficult to perceive what's going on. It overloads the circuits the brain needs for focusing, learning, remembering important details, and maintaining mental stability. The whole brain system goes into overload.



This is what happens when people are anxious about taking a test. Anxiety drives up the mental noise to such a pitch that they cannot see as much of the world around them, since the brain circuits usually available for recognition and understanding are busy with the internal noise. They will look at a test question and overlook certain words, miss the meaning of the question, and give the wrong answer. They can even miss seeing entire questions on the page!

This same process can happen when we are talking with our friends or family members. If we are not able to maintain a neutral feeling, we can literally be unable to hear what is being said and miss the meaning of what is communicated, which can further upset us.

Freeze-Frame: A Positive Emotion-Refocusing Technique

By using the Freeze-Frame technique, you can learn to take charge of your emotions—and refocus them—so that they work for you rather than against you. This tool was created by Doc Childre, a leading authority on reducing stress and increasing emotional balance. The Freeze-Frame technique has been the subject of years of scientific research and is used by CEOs of corporations, doctors, nurses, athletes, performing artists, firefighters, police officers, and people in the military. The steps of this tool are simple actions you can take to stop the chaos in your nervous system and quickly feel and perform better.

You could look at your life as a movie—in which you play the starring role. What you do from one moment to the next determines how the story in the movie unfolds and how it ends. Freeze-Frame allows you to pause the movie so you can step back and get a wider and more balanced view of any situation. Then you can ask yourself, “How could I handle this in a better way?”

With practice, you’ll find you have more choices or options for what you might do next—even right in the middle of an argument or when feeling stressed about all the things you have to do.

The Steps of Freeze-Frame®

Adapted from the original Freeze-Frame technique.

Step 1. Identify

Identify the problem or issue and your feelings about it.

Step 2. Heart Breathing

Breathe through the heart with a neutral attitude to help you become more detached from the problem.

Breathe slowly and deeply in a casual, comfortable way, and imagine the air entering and leaving through your chest and heart area. Heart breathing helps draw energy away from the brain, where negative thoughts and feelings are amplified. Continue heart breathing as you do the rest of the steps.

Step 3. Activate

Make a sincere effort to activate a positive feeling.

Now add a genuine feeling of appreciation or care for someone or something in your life. It's important to really feel the feeling and not to just think about it. It's the actual feeling of the positive emotions that releases the healthy hormones and helps balance the nervous system.

Step 4. Ask

Ask yourself what would be an efficient, effective attitude or action that would help resolve the issue.

Be open to any new perceptions or feelings.

The term “freeze-frame” is Hollywood lingo for pausing a film a single frame to take a closer look. A movie is made up of hundreds of thousands of frames of film strung together. The projector runs the frames past a powerful light so quickly that we perceive them as an ongoing story.

If we want to see a still shot of one of the moments in the movie flashing by, we have to pause the projector—or freeze the frame. When we’re watching a movie, we forget that we’re watching individual frames go by. It’s similar in real life. We get so caught up in the story

that it's easy to forget that it's made up of individual moments. When you freeze one of those moments, you have an opportunity to change what you might do next.

Research shows that when you practice Steps 2 and 3 and pretend to feel the breath flowing through the heart area while generating a positive feeling, there is a calming and balancing effect on your entire nervous system. There is also an improvement in how your nervous system, heart, and brain work together. By using the Freeze-Frame tool you can shift the pattern of signals the heart sends to the brain, reducing the inner noise and helping your three brains work together in harmony. This will stabilize your emotions and start to recharge your energy. Then you're less stressed and can think better, perform better, and have more fun.



If you practice managing minor irritations, anxieties, or angry reactions, you are creating a habit that can improve your day-to-day experience tremendously. But you're also building strength you can use in case you have to deal with a big crisis, challenge or unexpected change. If life really throws you for a loop—for instance a disaster happens at your school or in your community or nation, or someone you know becomes gravely ill—it can be really hard to bring some balance back to your emotions. That's natural when the rug seems to be pulled out from under everything you feel secure about. But once your emotional energy reserves are exhausted, your nervous system has to operate on raw nerve energy. That's when your nerves feel frayed. Next come the cycles of fatigue, despair, and depression.

By learning how to take charge of your emotions, you start the process of renewing your emotional buoyancy, which can help reenergize the nervous system. This can take time, but using a tool like Freeze-Frame can help you restabilize more quickly. Any time one person manages his/her emotions, everyone involved in the situation benefits. It's best if you can Freeze-Frame when you first notice you are feeling stress. But you can practice any time by recalling a stressful situation from the last day or week, or reflecting on something coming up that is making you uneasy.

Try the exercise below. (Take five minutes to do all four steps.)

Freeze-Frame Worksheet

Steps of the Freeze-Frame® Technique

Issue:

Reaction:

Step 1

Identify the problem or issue and your feelings about it.

Step 2

Breathe through the heart with a neutral attitude to help you become more detached from the problem.

Step 3

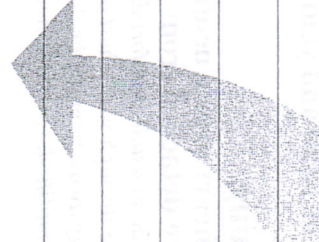
Make a sincere effort to activate a positive feeling.

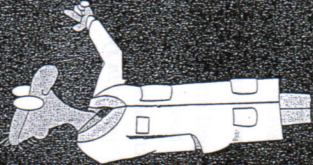
Step 4

Ask yourself what would be an efficient, effective attitude or action that would help resolve the issue.

Freeze-Frame Steps 2, 3, 4

Effective Attitude or Action:





TRY THIS:
Put your hand on your heart. Did you place your hand on the left side of your chest? Many people do, but the heart is actually located almost in the center of the chest, between the lungs. It's tipped slightly so that a part of it sticks out and taps against the left side of the chest, which is what makes it seem as though it is located there.

7 The Inside Story

Don't Be Discouraged

Once you've used the Freeze-Frame technique and have a set of a better way to handle a situation, don't be discouraged if your emotions flare back up again if the situation returns. You may find doing Steps 1 and 2 of Freeze-Frame is all you need to calm down to remember how you decided to handle the situation when you use Freeze-Frame before.

Choose a Different Response

When you get really comfortable with Freeze-Frame you'll experience the feeling of having more control in your life. That feeling of control is important. A survey conducted in 2002 revealed that Americans' sense of control over the sources of stress and tension in their lives is a big factor in their ability to cope with that stress and tension.

But what's important to realize is that while you can't always control what events happen in your life, you can control how you respond or react to them. Using the Freeze-Frame technique helps you stop stressful response and find a different one.

The Real Story

Now you have the inside story on the three-part brain, emotions, memories, your nervous system, and heart-brain communication. You have seen how your emotions can help you and how they can hurt you.

You've also learned that it's possible to change the way you feel by generating uplifting feelings that allow your nervous system, heart and brain to work together harmoniously. And you've learned a tool that's designed to help you do that.


What you do with all this information is the *real* inside story. It's *your* story.

When you are . . .

- ☐ taking a test
 ☐ playing sports
 ☐ playing music
 ☐ giving a speech or presentation
 ☐ listening to someone who is trying to tell you something
 ☐ other _____

When you are feeling . . .

- ☐ social pressure
 ☐ embarrassment
 ☐ picked on or bullied
 ☐ frustrated or angry with someone
 ☐ afraid to speak your truth to someone
 ☐ tempted to take drugs or drink alcohol
 ☐ upset because you can't sleep
 ☐ anxious about having a lot to do
 ☐ other _____

 Put a checkmark next to the situations in which you would like to feel more in charge of your emotions.

What's stressful to you might not be stressful to the next person, and vice versa. But there are many situations listed here where stress is common and where Freeze-Frame can make an important difference.

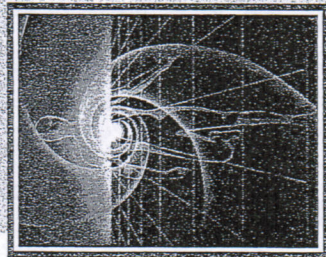


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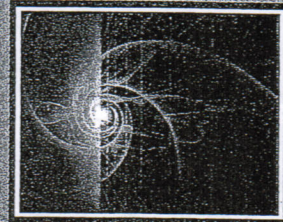


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They are very fast, even faster than thought. They're invisible—we can't see them and often don't even know they exist. At other times, they're as loud as a thunder storm booming inside us, visible on our faces, and in the way we move. Without them, we can't enjoy food, have fun with friends, or feel the stir of music. With them, we can feel miserable and content, or joyful and happy.

*What are they?
Our feelings and emotions!*



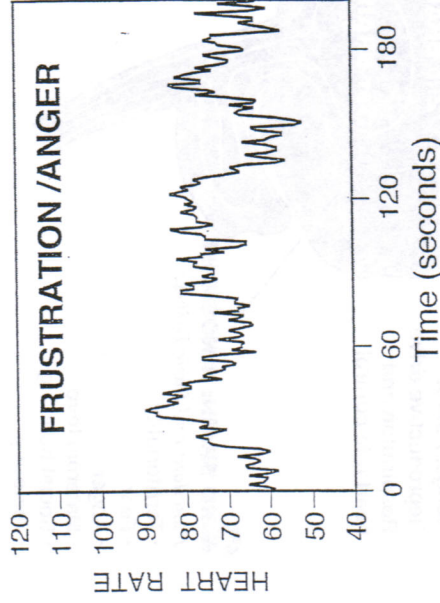
1 Riding the Wave

The word “emotion” can be defined as “energy in motion.” An emotion is a strong feeling—a feeling such as joy, sorrow, or anger—that *moves* us. The experience of emotion makes life matter. It transforms our world from a series of events and facts into a living, breathing experience. For instance, you’ve had a rotten day, you come home and your dog is wildly wagging his whole body because he loves you no matter what. Just seeing him, you start to ease up on yourself and forget about your awful day.

You may not always be aware of your deeper feelings and how they are affecting your body, energy, thoughts, and relationships. You might notice tension or an upset stomach. Sometimes, you might even feel your heart pounding in your chest.

In fact, one of the easiest ways that scientists observe how feelings affect our bodies is in the effects they have on our heart rhythms. When emotions are strong, they can be detected in the changing pattern of our heart rhythms.

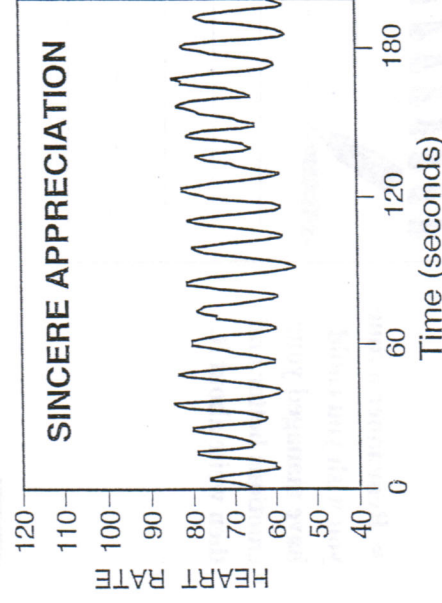
When people are frustrated, scared, worried, angry, or upset, their heart rhythms are uneven and irregular. When these uneven, irregular heart rhythms are viewed on a computer screen, they look like jagged mountain peaks.



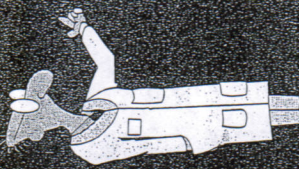
The graph to the left shows changes in the heart rate pattern. The random, jerky pattern is typical of feelings of anger or frustration.

When we are upset, it’s usually hard to think clearly. Making a wise choice is tough for anyone when they are emotionally upset. Have you ever said something to a friend in a moment of anger that you later regretted?

However, when we are feeling confident and secure, feeling cared for, or appreciating someone or something, our heart rhythms are smooth and even like the ones in the diagram below. Scientists now know that the heart and brain are connected and that smooth and even heart rhythms make it easier to think clearly and make better decisions.



The graph to the left shows changes in the heart rate pattern that are typical of feelings of appreciation and other positive feelings. It is what scientists call a highly ordered or coherent pattern, which is an optimal state for health and learning.

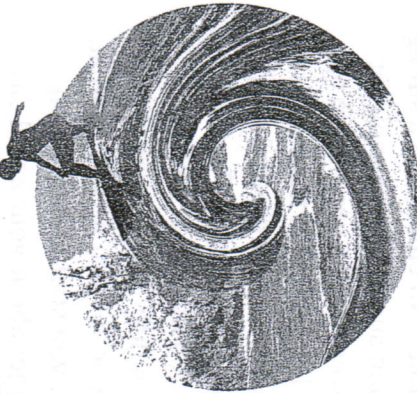


DID YOU KNOW?

In recent years, scientists have discovered that the heart has its own independent nervous system—a complex system referred to as “the brain in the heart.” This system receives and relays information back to the brain in the head, creating a two-way communication between heart and brain.

This short book is designed to give you the inside story on emotions. You will get basic information on how different parts of your brain function and work together, how emotional memories affect your behavior, how your emotions and nervous system are related, and how your heart and brain talk to each other. These facts will help you see why it is important to learn to manage your emotions.

Wouldn’t it be great to learn to ride the waves of emotion, instead of letting them engulf you or knock you over? That’s what managing your emotions is all about. For many people,



emotion is something that just happens to them. But what you’ll learn in this booklet is that it’s possible to take charge of your emotions. As you become skilled at this, you will feel better on the inside and become more self-confident, successful, and satisfied in what you do and in your relationships with others. As you learn to ride the waves of emotion, you will have more of a sense of adventure and playfulness that gives life that extra sparkle.

You’ll also find yourself thinking clearly more of the time. The **Freeze-Frame® technique** taught in this booklet will be a key for you.



► Remember a time you wish you could have managed your emotions better and then write about it.

2 The Three-Part Brain

Let’s talk about our equipment upstairs. The human brain is made up of many layers built around a central core. The diagram below shows the brain divided into three main parts. Some people refer to these sections as simply the 1st, 2nd, and 3rd brains.

1ST BRAIN: REFLEX / INSTINCT

Functions and Basic Drives:

- Approach / avoidance
- Hormonal control
- Temperature control
- Hunger / thirst
- Reproductive drive
- Respiration and heart rate control

2ND BRAIN: HINDSIGHT

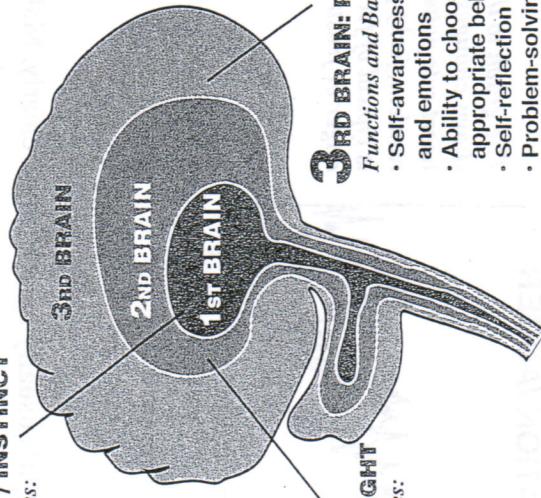
Functions and Basic Drives:

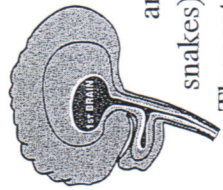
- Territoriality
- Fear
- Anger
- Maternal love
- Social bonding
- Jealousy

3RD BRAIN: FORESIGHT

Functions and Basic Drives:

- Self-awareness of thoughts and emotions
- Ability to choose appropriate behavior
- Self-reflection
- Problem-solving
- Goal satisfaction





1st Brain

The 1st brain controls your instincts, reflexes, and basic physical functioning. Amphibians (for example, frogs and salamanders), reptiles (such as alligators, lizards, and snakes), and birds of all kinds have only this part of the brain. They act and behave mainly from their instincts. The 1st brain cannot solve math problems, but without it we could not survive. Our instinctual awareness of danger comes from this brain level. When we are hungry or thirsty, the survival instincts of the 1st brain will let us know and cause us to eat or drink. If this were the only brain level you had, instead of standing in a lunch line when you're hungry, you would rush to the food, pick it up, and gulp it down.

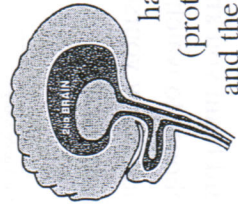


DID YOU KNOW?

Mice are born with an automatic avoidance of cats. It's instinct! This is an example of a first brain basic drive.

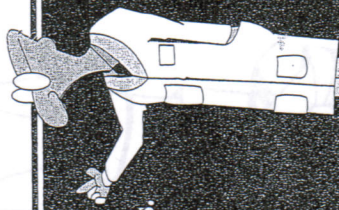


► Give an example of a time you acted from your 1st brain.



2nd Brain

This part of the brain is involved in many of our feelings and emotions. Without this brain, we could not have a sense of sadness or joy. Anger, fear, territoriality (protecting our turf), as well as feelings of security, pleasure and the joy of bonding with others are examples of the feelings the 2nd brain helps to make possible. Many animals, such as dogs and cats, have this brain level as well. This part of the brain gives us memory of past events. When you and a friend see each other, memories of your last conversation and how you feel about each other are available to you because of the structures and circuits in the 2nd brain that store those memories. The 2nd brain also makes it possible for us to have *hindsight*. This means that we can learn from our past mistakes and successes.

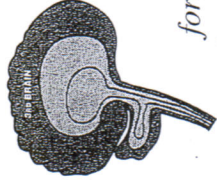


DID YOU KNOW?

- The adult human brain weighs about 3 pounds.
- Bottle-nosed dolphin's brain: about 3 1/2 lbs.
- Elephant's brain: about 13 lbs.
- Cow's brain: about 1 lb.
- Great white shark's brain: about 1.2 oz.
- Cat's brain: about 1 oz.



► Give an example of a time you acted from your 2nd brain.

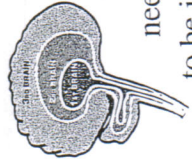


3rd Brain

The 3rd level of the brain, sometimes called the *cortex*, is involved in thinking, problem-solving, goal-setting, and planning. This part of the brain provides you with *foresight*, an important ability that allows you to see ahead and consider the consequences of your decisions before acting on them. This is an advantage over the 2nd brain, where unmanaged emotions can push you to act without considering future results. The 3rd brain also monitors the 2nd brain's activity and allows you to name and sort out your feelings and emotions. It can then help you decide what the best course of action may be for any situation.

For example, a comment from a classmate offends you, and you feel hurt or angry. You have to decide how you will respond. The 3rd brain reviews several possibilities: seek revenge, try to talk and resolve the conflict, let it go, forgive, or consider other options. It is the ability to understand the situation from many angles that can lead to a more intelligent decision. The 3rd brain can also help you notice when you are acting against what you feel is right. Some call this being aware of your *conscience*.

► Give an example of a time you acted from your 3rd brain.



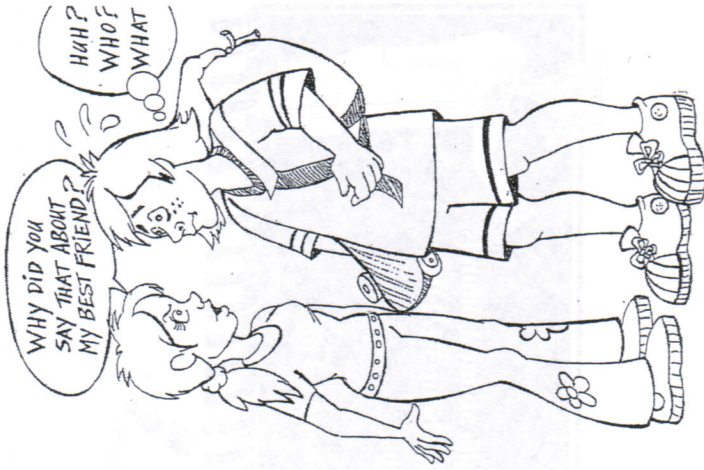
How the Three Brains Work Together

While all three brain levels interact all the time, if you want to use all of the abilities available to you, all three need to work together in harmony. In other words, they have to be in sync with one another. However, this is not always the case. Often we rely too much on one brain level. For example, when we act mainly from the 1st brain, we react from instinct alone with no thought given to the consequences. When this happens we do not consider how someone else may feel, and our action may get us into trouble.

At other times, we may act primarily from the 2nd brain. In this case, unmanaged emotions can play too strong a role in our decisions and behavior. We can keep worrying about something that is not really worth it or get angry over a situation when we don't have all the facts. For example, rumor has it that your boyfriend said something about

your best friend that wasn't true. If you'd bother to ask what he really said, you might find out that it wasn't what he said at all. Sometimes, we get mad first and ask questions later.

If the 2nd and 3rd brains are not working together well, we may not even know what we are feeling, yet the feelings can drive our actions and affect our thoughts and decisions. For instance, with your 3rd brain you know you need to work on your science report, but you choose to watch TV instead. During the show, you can't quite relax and enjoy yourself. You're anxious about the report, though you may not admit it.



An important aspect of growing into adulthood is getting the 2nd and 3rd brains to work together harmoniously. The 2nd brain involves acting on our impulses and emotions, sometimes without much awareness of how our feelings are affecting us. The 3rd brain allows us to gain more power to control our impulses and emotions. We see more clearly what's meaningful to us in life and make more of our choices based on these values.

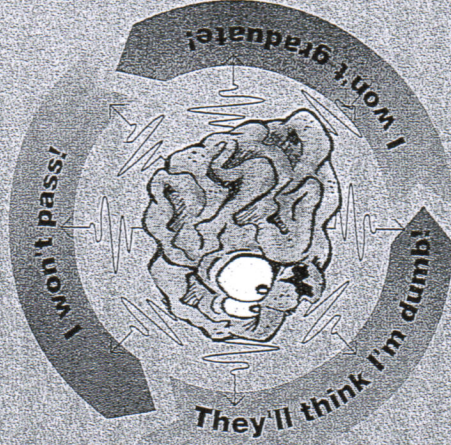
As we've already said, the 3rd brain provides foresight that allows us to see ahead, so we are able to consider the consequences of our decisions before acting. However, when we are operating mostly from the 3rd brain, we can get trapped in **"looping thoughts"** that lead to excessive worry and anxiety.

What are "looping thoughts?"

Thoughts that loop are the ones that keep coming up over and over again. We just can't seem to get rid of them. They can trigger feelings of fear and insecurity.

Below are some examples.

- ▲ I'll never pass the test.
- ▲ I'll never get a date—I'm not good at talking to people.
- ▲ I'll never get all this done.
- ▲ I can't possibly learn all I need to know for the test.
- ▲ I can't believe I said that. I feel so stupid.



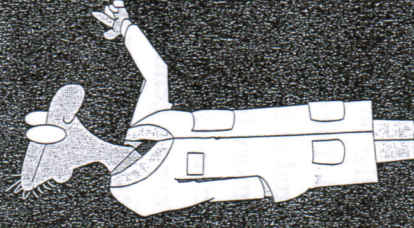
Some people can become disconnected from their emotions and operate primarily from the mind's logic. You've probably met people like this who can overanalyze everything! But operating mainly from the mind can lead to a lack of feeling and emotional experience—an rob a person of joy and deep friendships. It is also now known that the 3rd brain needs the feeling parts of the 2nd brain in its decision-making processes when choosing appropriate actions and behaviors—for instance, the right thing to say in a social situation and the right time to say it. It just makes sense that the brain would need more than pure logic to make wise choices.

We need to have good communication between our emotional and logical centers to be able to recognize and understand what others are feeling and how our behaviors are affecting them, a skill that is critical for making and keeping friends.



DID YOU KNOW?

There is an average of 100 billion neurons in the human brain. Each neuron or nerve cell is connected to other nerve cells in the brain by sometimes hundreds or even thousands of connections, called synapses. It is estimated that there are over 1,000,000,000,000 (that's a quadrillion) connections in the brain, more connections than there are stars in the universe.



3 Emotional Memories

Memories of how people have felt in the past are processed in the *amygdala* (ah-MIG-dah-la), an almond-sized structure located in the 2nd brain. Emotional memories can cause people to react automatically—based on things that happened in the past. Many of these reactions, however, may not be appropriate for the current situation.

Here's why . . .

Emotional memories can be triggered by something that is happening in the present that is similar to something that happened in the past. The feeling pops in so fast that the 3rd brain doesn't have time to think about what's different. Without thinking, we just react—for example, we get upset, scared, angry, or nervous—with feelings that are “triggered” by the memory of a past situation.

When people feel a strong emotion, the amygdala remembers it, along with many other details connected with the event. Even things that are indirectly related to the event can trigger the old feeling without our even being aware that this is happening. The amygdala takes in all kinds of impressions like sights, smells, tastes, and sounds and uses a “*fast track circuit*” to try to find a match with something that happened before.

For example . . .

Let's say you can't stand the smell of fresh asphalt. This may be because you had a bad crash on your bike on fresh asphalt when you were younger. You may or may not even remember the crash, but your amygdala does, and it links that smell with the crash.

Here's another example . . .

A boy was bitten by a dog when he was young. The bite hurt, and the boy was frightened. The event became stored in his emotional memory bank. As a teenager, the sight of a dog—even a gentle one—still triggers a feeling of fear or hesitation.

Here's what goes on in the brain to make this happen . . .

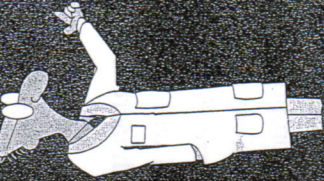
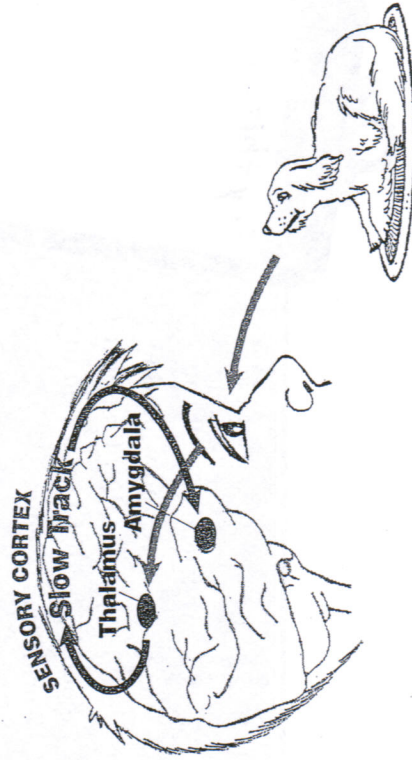
When this teenager sees a dog now, his brain instantaneously compares the image of the dog with his past memories through the *fast track circuit*. The brain finds a match—with the memory of “dog” and getting bitten—and triggers a feeling of fear. This *feeling* then affects his 3rd brain perceives the dog. He reacts with a fear of dogs without knowing why.

How Emotions Affect Perception: *The Fast Track*



The *information* about the dog goes to the 3rd brain through another pathway—the “*slow track circuit*.” If the 3rd and 2nd brains are working well together, the 3rd brain can then tell the 2nd brain that everything is OK. It’s a friendly dog, and there is no reason to feel threatened. However, even if this happens, the initial reaction has already sent signals down the boy’s nerves causing stress hormones to be released into his body.

How Perceptions Affect Emotion: *The Slow Track*



DID YOU KNOW?

The only sensory input that goes directly to the amygdala is that of smell. Input from the other senses goes to another brain center—the thalamus—to be distributed. That’s why smells can have such a powerful influence in triggering our feelings and emotions.

Of course, such memories do not happen just with dogs. They happen with all of our past situations, including our relationships with other people—and places and situations that have left deep impressions on us. A person with a certain kind of walk or body type might cause you to feel fear because he reminds you of someone who once bullied you. The smell of a hot dog can make you nauseous because you once came down with a stomach flu after eating one. You may dislike people with red hair because of that one red-headed person who once picked on you. And the list goes on.

Our emotional memories can cause us to stereotype whole groups of people with certain physical characteristics, affecting how we think about them.

► Remember a time when a past memory was formed and how it affects you now in the present.

