The Conscious Stream

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Acknowledgment

I am grateful to those who have dedicated some part of their lives, or even life itself, that we may live in freedom, and pursue health and happiness.

Denise Ingebo-Barth
July 4, 2000

Contents

Forward to the Review Edition

Who would be interested in this model, this edition?

Readers most likely to be interested in this book are those who like to explore ideas about the physical character of consciousness. Students of neuroscience may be especially interested in evaluating a model that postulates how activity in the nervous system translates into personal experience.

Other potential readers are those of us who were looking for self-knowledge when we signed up a for a psychology or a physiological psychology class. Others who may be interested are readers who believe that ideas about how emotions arise in the conscious stream are important keys to developing emotional balance. In other words, the model may be a valuable reference point for anyone who enjoys examining clues to emotional fitness.

But can the average person relate to this model? As it's described here, the process that forms the conscious stream is essentially simple, and can be explained using visuals and common terms. Think of the explanation as parallel to descriptions that show how muscles work or how the lungs exchange oxygen for carbon dioxide.

A suggested way to use this book:

As Albert Einstein said in 1938, "Most of the fundamental ideas of science are essentially simple, and may, as a rule, be expressed in a language comprehensible to anyone."

My goal has been to describe this model in a clear and useful way. If it's a good, accurate, moment-to-moment explanation of how the conscious stream works, a reader may be able to begin relating visual counterparts of the model to his or her own experience. After each major link of the theory is presented, an area is provided for ***Notes*** so that reading and relating to the model may be more interactive.

If these ideas are being reviewed with others, the model can be used, for example, to compare how certain feelings evolve, discuss how thoughts come to mind, and identify the role of sensation in generating experiences.

Summary

THE CONSCIOUS STREAM describes a theory built on the idea that consciousness–a stream of separate conscious instants, like frames making up a reel of film–is formed as trajectories circulate around the nervous system circuitry.

In this model, a trajectory is a series of neuron groups energized in turn. (Picture it as a sequence of lights flashing around a marquee or perhaps as a comet blazing through a linked series of packed neuron groups–through circuits of the nervous system.)

When a trajectory passes through the thalamus–a central area of the brain–an instant of experience is inserted into our lifelong conscious stream. This instant of consciousness can be a *sensation*, *thought*, or *feeling*. The particular instant depends on the source of the trajectory. When a trajectory is initiated by sound waves to the ear, and passes through the thalamus, for example, a *sensation* (in this case, a *sound*) enters the conscious stream.

As the description of this model progresses, we see how a trajectory from the thalamus to the cortex is recorded, and becomes a part of a network of records . . . and how, when concurrent trajectories in the cortical network converge and generate a trajectory back to the thalamus, a *thought* enters the conscious stream.

In addition, as trajectories evolve–being repeated, prolonged, released or compounded–emotional *feelings* enter the conscious stream. Over time, patterns of invigoration and relaxation, stagnation and relief are generated, forming our life's emotional quality.

Finally, the model shows how links of activity form a cycle . . . and how a pattern of cycles forms an "activity." Patterns of activities, in turn, form a lifestyle. In this model, then, the character of *circulation* in the nervous system reflects emotional fitness.

Although designed primarily for students of neuroscience, this proposed model may also be evaluated by those having an interest in the physical processes underlying emotional fitness.

Part 1

Looking for the Physical Character of Consciousness

Introduction

Looking at Consciousness: a New Technique

Another new way of looking at consciousness

Following recent advances in research, there's been a jump in the public's awareness of the underlying processes that make the body function well.

Through the lessons contained in hundreds of books and videos, we've come to realize how necessary this insight is in initiating and maintaining physical fitness. For example, by knowing what we need for nutrition and exercise, we can craft a balanced diet and exercise program that supports health, endurance and strength. And we have learned, in many cases, what to avoid to maintain health and repair physical problems that we once had to live with.

Now it's time to consider the importance of having an understanding of the processes at work that support emotional fitness.

To start, we have to know where the feelings we associate with emotions come from, because when we have an understanding of the processes that underlie emotional conditions and experiences, we have a base from which to develop emotional fitness. Just as, we have to have an understanding of the processes that underlie physical functions and conditions, to develop physical fitness.

Exactly what processes are we talking about? What happens to cause us to experience feelings, which are a significant part of our overall conscious experience?

To this end, this book presents a set of stand-alone theories that dovetail together to form a single model, a single model that shows how the nervous system forms the conscious stream.

With this understanding of the physical character of consciousness, I believe we can extrapolate the terms of emotional fitness. It's like knowing we need carbohydrates before a sustained exercise like running five kilometers. That knowledge alters what we eat as we prepare.

This model then, proposes a way of describing how activity in the nervous system forms everyday consciousness.

You have probably heard the nervous system called a circuitry. Well, this theory takes that concept a step further and adds *life* to the circuitry. It describes the work done as activity circulates through the system. In short, this model is about *circulation* in the nervous system.

Specifically, this model is built on the idea that the conscious stream (a stream of separate conscious instants we call consciousness) is made when energy-driven trajectories travel through and around the circuitry of the nervous system and pass through the thalamus, a central part of the brain.

In this model, a trajectory is a series of neuron groups energized in turn. (Picture it as a sequence of lights flashing around a theater marquee or perhaps as a comet blazing through a series of dots spaced around the pathways of the nervous system.) When a trajectory passes through the thalamus, an instant of experience is inserted into our lifelong conscious stream. The instant of experience can be a sensation, thought, or feeling. For example, if a trajectory begins (that is, absorbs energy from the environment) at sensory tissue in the ear and passes through the thalamus, a sensation of sound is experienced in the conscious stream.

In this model, as we follow the trajectory, we first see how a conscious instant is actually experienced, then recorded, and later recognized. Then we see how patterns of cycling trajectories are generated. Finally, we see how patterns of trajectories circulating in the nervous system support emotional health, and by extension, social and environmental well-being, which in turn supports personal well-being.

A new technique

Where did these ideas come from? My personal interest began when, at about eleven years old, I wondered what caused feelings.

I wanted (with the naiveté of youth) to ensure I could bring good feelings into my life whenever I needed cheering up.

In those early years, I thought I could get what I was looking for (how feelings were formed) by reading psychology and philosophy books. But I couldn't find anything to explain how experiences occur moment by moment.

From the beginning, however, I believed experience had something to do with the body, because, when I closed my eyes, I quickly saw a different visual image. In other words, when I closed my eyes, my consciousness–of which sensations such as sight are a large part–immediately changed. And I noticed changes in sensation often lead to changes in what I was thinking and feeling–other forms of consciousness. So I knew sensation somehow depended on something happening in the body.

Then, in my teens, I read that the nervous system was the particular part of the body that was responsible for consciousness. So, when you put your hands over your eyes, you are actually preventing light waves from entering, preventing your nervous system from absorbing and using this energy.

I then began reading everything I could about neuroscience, physiological psychology, and related research.

Although interesting, these sources didn't offer a description of how experiences enter our conscious stream, second by second.

A new model comes into focus

With this scientific background in mind, however, and with the assumption that the nervous system was responsible for consciousness, I set out to find out the underlying processes that define the relationship between the nervous system and consciousness, including the emotional feelings I was still curious about.

I started by looking at the problem as if it were an equation. On one side, the nervous system, and on the other side, conscious experience. How can they be reconciled?

To best define the physical side of the equation, I immersed myself in the study of the physical nervous system--its organization and behavior. I learned about neurons–tiny electrochemical beings found in three-dimensional clusters and linked to form elaborate circuitry. I also learned that the nervous system is constantly exposed to a variety of energies from both the body tissue and the environment.

Then, on the conscious experience side of the equation, I wondered how I could define the intangible conscious stream more precisely. I found an answer when I began looking at consciousness as a reel. I saw consciousness as a lifelong reel of film in which each frame is a sensation, a thought, or a feeling. This metaphor worked because we experience a series of distinct conscious instants, and, like the separate frames of movie film, the separate instants of consciousness blur together to make a seamless experience.

After learning about the nervous system and defining the patterns of instants that make up conscious experiences, I began to compare the two kinds of information to learn how activity in the nervous system–often called a circuitry–could actually form the conscious stream. First I found qualities of the nervous system and conscious patterns that matched. Then I used these correlations to form a model–a model that

shows how experiences can be explained in terms of activity in the nervous system.

Among the first correlations I noticed between the nervous system and the nature of consciousness was that both have a definite cyclic character. The nervous system is often referred to as a circuitry because of its many connections and pathways that form circuits. Consciousness, on the other hand, is made up of sensations, thoughts and feelings–experiences that happen over and over, forming reoccurring patterns in the conscious stream. For example, we often experience patterns like these: thought ➔ thought ➔ feeling ➔ sensation ➔ feeling ➔ sensation ➔ thought ➔ and so on.

With these repetitive patterns and neuroanatomical and neurophysiological characteristics in mind, I began to wonder *what has to happen* in the nervous system to make a particular experience occur? In other words, what causes the particular patterns I identified. Why do the patterns come in these typical familiar orders? What happens in me to enter the experience in my consciousness? What causes the: thought ➔ thought ➔ feeling ➔ sensation ➔ feeling ➔ sensation ➔ thought ➔ and so on?

I looked for explanations, too, for other situations: What happens after experience fades? And, what happens to build an emotion?

As I continued to review these cyclic patterns and to review the structure and electrochemical nature of the nervous system, I laid the foundation of the two halves of the equation. A model emerged with this central concept: As energy is absorbed by (and converges in) the system, activity circulates in the nervous system's circuitry and, in doing so, supports the reoccurring events we experience in the conscious stream.

Focusing on the circuitry during my late teens, I began actively looking for the links between the nervous system and consciousness. At a medical school bookstore, I found texts that stressed a strong link between consciousness and a group of neuron groups near the center of the brain called the

thalamus. Therefore the model I developed uses the idea that the neuron groups of the thalamus and the pathways that enter and leave the thalamus are central to consciousness. They are the essential conscious circuits.

With these pathways and patterns in mind, clarifying the model was like rubbing the side of a crayon on a sheet of paper covering a leaf. After many passes of the crayon, the outline of a leaf is revealed, and, with more passes, details come into focus. So as the patterns of the conscious stream became more detailed, I was able to recognize and predict activity responsible for a wider range of experiences. The contours of the model gradually gained definition.

Relating to your experience

How closely does this model reflect reality? In reviewing this presentation, you can judge its validity yourself because you naturally have a rich intuitive understanding of how a system you use every day works. You are familiar with the same patterns I saw.

For example, you know that you experience a variety of sensations and feelings during the day. And you know you record them in some way because you can remember or summon up past sensations and feelings. You're also familiar with a range of emotions and know the experience of having those emotions evoked. You also realize that some emotions lead to certain thoughts and sensations. And, you know you can derive fresh thoughts and solve problems if you change the factors you are resolving. So your knowledge of how your conscious stream works is an inherent part of you.

I'm sharing these ideas because they are simply what seems true for me–for how I think I work. And if they relate well to your experience, we might use the model to find ways to be the best we can be, personally, socially and environmentally.

The description that follows, in eight chapters, begins with a physical description of the nervous system–viewed both traditionally (as established neuroscience) and theoretically

(with these new concepts). It ends with a theoretical description of activity that underlies emotional fitness.

- **Chapter 1** highlights the structure of the nervous system and explains how activity converges and diverges in circuitry–forming trajectories.
- **Chapter 2** describes how sensations enter the conscious stream and how they are experienced.
- **Chapter 3** explains how each instant of consciousness is recorded, building a network of records.
- **Chapter 4** shows how activity in the resulting network of records is resolved, providing us with recognition and orientation.
- **Chapter 5** explains how thoughts are derived by converging trajectories in the network.
- **Chapter 6** discusses how sensations and thoughts lead to a spectrum of simple, sustained, and released feelings.
- **Chapter 7** examines how patterns of sensations, thoughts, and feelings form activities.
- **Chapter 8** explains how patterns of these activities form a lifestyle and influence the quality of our lives. Understanding the roles of these patterns will help us to see how a healthy lifestyle supports physiological well-being, as well as the well-being of our society and environment. Integrity of the nervous system can be viewed as a state of soundness that nurtures and is beneficial to good health. In turn, personal health promotes health in society, as well as in the surrounding environment.

Notes

Notes

Chapter 1

The Physical Model: Circulating Trajectories

To understand how the conscious stream is formed, it's necessary to know a few things about the nervous system. In neuroscientific literature, much is now known about the strong, spongy, soft, and sinewy "gray matter" we call the nervous system.

For this discussion, we need only to understand those elements of the nervous system–both traditional and theoretical–that explain its relationship to consciousness. We'll start with a sketch of the structure we need, and then see how the energy absorbed by the structure generates trajectories. In succeeding chapters, we'll see how these trajectories perform an important role in the formation of each person's stream of consciousness.

Structure: neurons and *conscious pathways*

Central to the nervous system is the brain. Its surface is covered with a number of interfacing neuron groups–three-dimensional clusters of neurons–that fit together like pieces in a quilt design. This "quilt" of layered neurons is called the cortex. Neurons, as we will see, make connections by using two kinds of branches: short dendrites and the often longer axons. Both kinds of branches extend throughout the

cortex, but only axons reach out of the cortex into another group of neuron clusters called the thalamus. The clusters of the thalamus are packed together near the center of the head.

The nervous system is composed of many integrated clusters. For this model, we will focus on a linkage of clusters directly related to consciousness–the clusters that form the conscious pathways. The cortex and thalamus are central links of these pathways. But also important are the clusters connected by branches (axons) that reach to the midbrain and to clusters in the spinal cord. The axons of these groups often join together in long, tentacle-like pathways called "nerves" that cascade their way into all parts of the body. Nerves reach into an array of body tissues, including our integrated muscle system.

At the body's periphery, the branching changes direction. Within the body tissues, embedded clusters send axon branches in the opposite direction from the other axons making up the nerves. These axons extend back toward the spinal cord; they are directed inward (sharing the nerves that come from the spinal cord). The dendrite branches of embedded clusters, on the other hand, extend to positions in the body from which they absorb energy from tissue and the environment.

From an energy absorption point of view, the sensory clusters in the periphery can be seen as the start of the "conscious pathways" (i.e. activity in these pathways potentially reaches the thalamus.)

Dendrites are receptor branches that specialize in receiving energy patterns. So the neurons making up the sensory clusters send dendrites to absorb energy. And axon branches of these neurons send branches back into the spinal cord. In this way, the circuitry turns back into itself. Connections extend back into the spinal cord, the midbrain, and the thalamus, as well as on to the cortex, completing the circuitry.

The clusters making a loop from the cortex to the periphery tissues and back create a major circuit involving

the conscious pathways. Many other integrated sub-circuits also contribute to the structure of the nervous system. As clusters send branches in many directions to closer clusters, the shorter local circuits complete a richly integrated circuitry.

To review, clusters of neurons are the structural links of the nervous system. And the branches of neurons from the clusters connect to form a circuitry. The connections made by neuron branches join clusters in many directions-like the dots of a three-dimensional dot-to-dot puzzle. For this model, we'll look at pathways that link the sensory tissue to the thalamus and cortex.

To describe the behavior of neurons, let's start with their basic character. Each neuron is a single cell that has a body, two kinds of branches, a surrounding membrane, and an internal molecular character. The two distinct kinds of branches that extend from the body of a neuron are (1) a dendrite, which absorbs energy from body tissue and the environment, and (2) the axon, which acts as a conduit for expressing the current "personality" of the neuron by generating coded impulses. A typical neuron has many dendrites for absorption, but only one axon for expression.

The membrane that surrounds each neuron plays an important role. It encloses the neuron, holding energy in, until the molecular composition of the neuron calls for release of the energy. When energy is released by the neuron, the personality of the neuron is expressed. The unique molecular makeup of each neuron makes it a tiny bit of self-contained information.

Each cluster of specialized neurons, then, is a composite of information. Hierarchies of neuron clusters in the nervous system form integrated centers of information that are joined by pathways. Now let's see what happens within the integrated information of the conscious pathways.

Energy enters the circuitry

We've just reviewed the structure of the nervous system. Next, let's look at the role of energy and how the circuitry handles

energy. When energy is absorbed, parts of the nervous system come alive. Energy from the environment, body tissue, or other neurons causes small, but distinct, changes in the character of a neuron.

After the energy has been absorbed, and the character of the neuron is adjusted, the axon branch of the neuron expresses the change to adjacent neurons in the circuitry or to body tissue. This process is continuous. The character of a neuron may or may not dramatically change, but it is constantly expressed by the axon through coded impulses to integrated neurons in the circuitry.

We are continuously exposed to energy patterns from the environment and the body called sensory energy. Through their dendrites at the outlying areas of the circuitry, peripheral clusters of specialized neurons absorb sensory energy in ever-changing patterns.

Some familiar examples of sensory energy patterns are sound waves absorbed by the ear (a peripheral part of the nervous system) and light waves absorbed by the eyes (also peripheral parts of the nervous system). Neuron clusters within body tissues also gather patterns of energy through exposure to hormones and muscle tensions.

When a neuron cluster absorbs energy, such as the sound waves of Bach or the Beatles, the energy pattern activates a pattern of neurons in the absorbing cluster. In other words, exposure to energy activates a focused pattern of highlighted neurons in a cluster.

Consider the absorption of an energy pattern such as a bright image. Because, for the most part, dendrites of a cluster bring in energy, the neurons energized by a bright image are like the beam of a flashlight casting a pattern of yellow light into the cluster. That yellow light illuminates or energizes a set of neurons in a cluster.

Now, imagine a three-dimensional cluster of neurons that has been exposed to a different environmental energy delivered by a wave of sound, such as a shout from a spectator at a ball game. In this neuron cluster, another

pattern of neurons is energized, reflecting the pattern of the shout. In both cases, how light or bright that pattern is depends on how much energy the cluster has absorbed.

The peripheral clusters of the nervous system are entrances that allow the continuous penetration of energy into the circuitry. But, as we'll soon see, the intensity of incoming energy isn't the only way energy is "propelled" in the circuitry.

A trajectory forms

When a pattern of intense energy is absorbed in a neuron cluster, the pattern of energized neurons contrasts with non-energized neurons in the cluster. The contrast can be soft, like the contrast of feeling a warm hand on cold skin, or highly focused, like a pin prick on your index finger. Typically, absorbed energy (think of energy from absorbed warmth) starts penetrating the circuitry.

So once a pattern of energy enters the system, if the pattern is strong enough, it is propelled on to the next cluster as coded impulses. The energy travels down the axon branches to energize a pattern of neurons in clusters next in line, in the circuitry. At the cluster-to-cluster level, energy is propelled along as neurons beam impulses to successive clusters in the circuitry, like a Pony Express rider picking up fresh horses at regular intervals..

On the other hand, when an absorbed energy pattern is weak, such as warm air blown on skin that is already warm, the energy pattern often fades quickly within the neurons of the cluster. The impression is muffled, like an object sinking into a goose feather pillow. Similarly when an absorbed pattern is unfocused, energy spreads out and diffuses in the cluster. In these cases, because energy isn't intense, it doesn't penetrate very deeply into the circuitry.

A trajectory propels

Now let's look farther into the circuitry, because a cluster deeper in the circuitry often receives energy patterns from

more than one direction. Energy from different sources may activate the same or different neurons. Let's examine the alternatives.

When simultaneous energy patterns converge in a cluster, the different sources of energy may highlight the same neurons. If incoming patterns energize the existing energy pattern in the cluster, the pattern is strengthened and propelled farther. In other words, because energy accumulates in that pattern, its neurons are highlighted with more intensity. The incoming patterns are thus resolved.

As these incoming patterns become superimposed on the same neurons, the pattern of neurons becomes strengthened. The accumulated energy intensifies and re-enforces the focus or shape of the pattern. When enough energy accumulates, impulses through axon branches are generated and the pattern is propelled to the next cluster.

A propelled pattern with enough initial or converged energy forms a trail, like a comet, as it activates a series of clusters.

This energy-driven trajectory penetrates the circuitry. The energy activates clusters along pathways through the circuitry as far as its intensity "pushes" or as the pattern is reinforced at succeeding clusters. In other words, in addition to direct absorption, convergence energizes and maintains a series of neuron groups–a trajectory–in the circuitry.

A trajectory diffuses

Because energy highlights different neurons in a cluster, the incoming energy patterns diverge, rather than converge, in a cluster. Through divergence, the incoming energy dissipates and fades out. Because too little energy is spread among the neurons in the cluster, they aren't reinforced with energy. No pattern in the cluster is strengthened with superimposed energy, and no single pattern can become focused and dominant. The lack of convergence leaves the energy of the cluster unfocused. Because of diffusion, the neurons of the

cluster can't generate the impulses that propel a pattern forward. Impressions remain blurred or confused like objects viewed through fog. You've been told to expect a message but the message never arrives.

In summary, we have seen the convergence and divergence of activity in the nervous system. A high concentration of energy may maintain propulsion far into the circuitry. When an energy pattern with relatively average intensity is absorbed by a cluster, it either takes the same path, highlighting the neurons that are already energized, or highlights different neurons. If the energy pattern takes the same path, energizing a highlighted neuron pattern, energy converges on those neurons and the pattern is propelled forward.

If the energy pattern highlights different neurons by diverging in a neuron cluster, the energy is diffused and does not generate impulses. It's like a locomotive gradually running out of steam.

A trajectory circulates

Overall, the propulsion of trajectories in the circuitry begins when incoming energy from the neuron clusters at the periphery of the circuitry absorbs intense energy. And that propulsion is sustained in the circuitry as energy converges.

A series of clusters with converged energy, then, forms a trail as the energy is propelled into the circuitry. Looking at the circuitry as a whole, diverging patterns cause trajectories to fade out while converging patterns reinforce trajectories throughout the system. Because energy is constantly being absorbed by many different parts of the nervous system, energy converges and diffuses in many places throughout the circuitry.

Each trail is a trajectory. And as energy continues to absorb and converge, multiple trails of energized clusters are generated simultaneously in the circuitry. In fact, at any one time, many hundreds of highlighted trajectories are simultaneously being generated and then fading.

Through converging energy, simultaneous trajectories are resolved in the network and propel that resolution forward. And because propulsion, reflecting resolution, is the basic work of energy in the circuitry, the nervous system works best when it's able to resolve concurrent information and maintain propulsion. Over time, the circulation of energy-laden trajectories activates and adjusts the integrated information of the circuitry. The nervous system thrives on developing and maintaining a clear focus–that is, maintaining clear resolutions–from cluster to cluster.

Note: In terms of relating this model to neurochemistry, we can postulate that the neurotransmitter serotinin "greases the skids" as energy circulates in the circuitry–supporting the convergence of energized trajectories–in the formation of resolutions (the ongoing work of the nervous system.) The amount of the neurochemical available is relevent: not enough (along with other variables) can cause *circulation* in the system to stagnate. Too much, on the other hand, can cause an over-abundance of superficial resolutions. Later we'll see how circulation in the nervous system affects the content of consciousness, including emotional health.

Trajectories through the thalamus

To review, at any one time, comet-like trajectories are circulating in the nervous system. The trajectories highlight pathways, or trails, as they pass through all areas of the circuitry.

Now we'll introduce a part of the circuitry called the thalamus, a group of clusters near the center of the brain. As I developed this model of how the conscious stream is formed, I assigned new theoretical qualities to the thalamus. Because it became apparent that the repetitive events associated with consciousness relate to corresponding cyclic qualities of the nervous system, a new concept developed. This concept is that a trajectory passing through the thalamus places an instant of consciousness–a sensation, thought, or feeling–into our conscious stream.

Returning to the analogy that consciousness is like a reel of film, consider that when a trajectory passes through the clusters of the thalamus, a new frame of film is added onto the reel. With each pass, a sensation, thought, or feeling instant enters the conscious stream.

The particular kind of instant experienced depends on the origination of the trajectory. A trajectory generated from energy entering the sensory tissue of the circuitry to the thalamus puts a sensation in the conscious stream. If a trajectory originates in the cortical area of the circuitry, a thought is put into the conscious stream. And, when a trajectory originates in muscle and other tissues, a feeling enters the conscious stream.

Tracing the trajectory

Next, we'll follow a trajectory from the nervous system's periphery to the thalamus and see how we actually experience sensory conditions. After that we'll look at how the stream of consciousness is recorded. And, in succeeding chapters, we see how activity in different links of the circuitry derive the other instants: thoughts and emotional feelings.

When we join these links of activity together, we'll follow trajectories as they cycle around the system, resulting in other familiar experiences.

Notes

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Part 2

Kinds of Conscious Instants

Chapter 2

Experiencing Sensation

During my late teens, when I began actively looking for the links between the nervous system and consciousness, I found that medical school textbooks stressed a strong link between consciousness and a group of neuron clusters near the center of the brain called the thalamus. So the model I developed was based on the theory that the clusters of the thalamus and the pathways that enter and leave the thalamus are central to consciousness.

These pathways are the essential conscious pathways of the nervous system. And this led to the concept or idea that a circulating comet-like trajectory passing through the thalamus puts an instant of consciousness (a sensation, thought, or feeling) into our conscious stream.

In this section, we will look at how a sensation is added into the conscious stream and how we actually experience it. We'll start by looking at the qualities that make up a sensory instant.

Qualities of a conscious instant

What makes one conscious instant distinct from any other? Look again at where the trajectories begin–at the sensory tissues. As energy patterns absorbed at sensory tissues enter

the pathways (and get closer to the thalamus), a dominant pattern comes into focus. Coming into the thalamus, the trajectory separates into small, spark-like mini-trajectories that simultaneously energize a combination of the thalamus clusters. Let's look at the sub-clusters of the thalamus (activated thalamus clusters). The trajectory stimulates a combination of these individual clusters making up the thalamus. The resulting, separate, energized clusters (sparks) create the separate, distinct qualities making up a conscious instant. So an instant of consciousness is a simultaneous combination of qualities.

Many clusters of the thalamus reflect qualities unique to a "single" sense receptor. For example, clusters in the thalamus receive connections directly from the eye. These connections are the base qualities of a sensation. Other thalamus clusters receive connecting branches from a variety of sources, such as eyes and ears and skin.

When these qualities are added to the base qualities of an instant, fullness is built up. In this way, a trajectory coming from any sensory tissue energizes clusters of that sense in the thalamus and also energizes clusters shared with connecting branches that spring from other sensory sources.

As an example, a typical trajectory coming into the thalamus from the eye energizes a combination of clusters. Imagine puffy clouds in a blue sky. Some of these thalamus clusters receive branches just from the eye, reflecting qualities such as the edge of a line or a color; other thalamus clusters receive branches from a variety of senses, reflecting qualities such as sharpness or softness. Together these superimposed qualities form a distinct instant.

Let's look at an inter-sensory cluster. The multi-sense cluster for the quality soft, for example, may also be shared with other sensations, such as a soft note of music, soft fragrance, soft touch, soft skin, soft vanilla pudding texture, or soft emotion. So trajectories from these senses energize the soft cluster as well as other clusters related to their specific sensory tissue.

In addition to familiar sensations such as those initiated when energy enters the eye, other less pronounced sensations are experienced. For example, we often take for granted a subtle, steady stream of feelings coming from our muscle landscape. Trajectories into the clusters of the thalamus enter muscle maps and reflect the positioning and potential tension patterns of our integrated muscles. A trajectory from facial muscle, for example, energizes clusters that have a detailed muscle map of the face. This map reflects a tension pattern that may vary from alert to tight to relaxed. On reaching the thalamus, the trajectory generated by the tension in specific muscles of the face will put this subtle, but constant distinct feeling into the conscious stream.

Actual conscious experience

We've seen how a trajectory from sensory tissue passes through the thalamus, and puts an instant of consciousness into the conscious stream. But how do we actually experience that sensation?

Sensation kindles when sensory tissue absorbs patterns of energy. As the eventual dominant pattern of a trajectory makes its way into the thalamus, it leaves in its wake a series of energized clusters in the circuitry ending at the thalamus. The result is a trail of energized clusters from a stimulated sensory tissue to the thalamus, like a trail of bread crumbs along a forest path.

Energized clusters forming this trail are vibrant parts of our body–they make up a series of little mini-experiences in us. Taken together, the tiny impressions form a single experience–an instant of consciousness. In other words, because the progression of a trajectory is instantaneous, the many energized patterns making up this trail are essentially active at the same time, and form a larger instant–a moment of consciousness.

This superimposed combination of energized clusters, beginning with sensory clusters, creates a definite impression in us, an impact we call a sensation. The particu-

lar sensory instant we experience depends on the active clusters that make up the trail from the sensory tissue to the thalamus. For example, if the trail runs from an ear to the thalamus, the sensation we experience is a sound and the specific sound depends on the energy pattern that was absorbed by that ear.

Following the trajectory

In the following chapters, we'll follow a trajectory from the thalamus into the cortex. We'll see how the cortex records the trajectory and how those records can affect the thought that enters our conscious stream. As we continue to follow the trajectory, we'll see how feelings are formed. We'll also learn how cycles of trajectories in a pattern make up an activity–a unit of cycling that yields a resolution. Finally, we'll see how a personal pattern of activities is the basis of our lifestyle and our emotional fitness.

Notes

Chapter 3

Recording Consciousness

Even before beginning this study I knew that making memories of my experiences was an important role of the nervous system. I also recognized that some content of the conscious stream rested on my abilities to recall what I had experienced and to use previous experiences in fresh and creative ways.

Recording a trajectory

In the first chapter, we saw how the nervous system absorbs energy, and uses that energy to generate trajectories in the circuitry. In the second chapter, we saw how trajectories from sensory clusters pass through the thalamus and cause us to experience sensation, such as warmth, sound, or muscle tension, in the conscious stream.

Now we'll follow a trajectory as it leaves the thalamus and enters the cortex, where a record is formed. And we'll see how this record becomes a part of a lifelong library, in the form of a network, which we can visualize as a network of fused records.

To review, branches from the neurons of the thalamus enter the thin clusters of the cortex, which are patched together to form a cortical quilt. These branches are like the

spokes of an umbrella, and the cortex is like a rounded umbrella top, covering the part of the nervous system we call the brain.

This umbrella cover, the cortex, is similar to a quilt composed of about fifty interconnected patch-like clusters. Although only six layers of neurons deep, the clusters in these patches contain thousands of neurons with branches that reach up and down among the layers, as well as sideways to other patches, and out of the cortex to other parts of the circuitry, such as the thalamus.

Separate clusters of the thalamus send their branches directly back to the corresponding clusters of the cortex.

The sparks of a trajectory in the thalamus clusters reflect the separate qualities of an instant. When the branches of these clusters extend to matching cortical patches, these patches also reflect the qualities of a conscious instant. In this way, the energized cortex clusters, just like the thalamus clusters, reflect the qualities of a conscious instant.

Now that the separate patches of the cortex are energized (like mini-sparks) reflecting the trajectory through the thalamus, the energy of these sparks continues moving sideways, like fireflies skipping over the surface of the cortex.

As the sparks of energy advance, they energize strings of neurons. This intense energy passes through these neurons, causing their surrounding walls to weaken.

Trajectory re-forms as resistance disappears

As energy flows like a quickly growing puddle laterally over the surface of the cortex, what happens when energized pathways keep spreading and collide?

When the energy of a trajectory from one direction collides with energy from another direction, a permanent chemical change occurs at the point of contact. This change occurs in the membranes (where they touch) of the strings of energized neurons. The collision causes such a strong chemical reaction that it breaks down resistance that the

neuron membranes had previously used to restrain the flow of energy between them.

Because of the fusion, the membranes don't keep energy contained as they originally did. This chemical change, in effect, fuses neurons together. And what originally started as a trajectory (separated into qualities) in the thalamus is now a united set of neurons in the cortex, like a connected dot-to-dot diagram.

What happens as a result of this connecting effect? Because there's no longer any resistance to the flow of energy between these fused neurons, a new open circuit is created.

As a result, in the future, energy flowing into one of the neurons, or dots, that make up the circuit, automatically flows into the rest of the circuit. This circuit-wide flow maintains the unity of the circuit formed by the trajectory.

This new circuit, then, is a permanent record of the trajectory. We can see that the trajectory that began back in the thalamus is a record of a conscious experience.

In this way, as a stream of trajectories pass through the thalamus, a continuous legacy of records is being formed as an ever more intricate network of circuits. We're constantly recording the world around us, as well as our thoughts and feelings; we're constantly building a personal circuitry of experience in our cortex.

Energy maintained in new circuit

In addition to the easy neuron-to-neuron flow of energy through the circuit, the whole circuit (like a highlighted dot-to-dot segment) is energized. The newly created energy level stays in this new circuit.

In other words, although some energy of the trajectory is used to fuse the neurons together, the new circuit still contains energy from its incoming trajectory. Thus, the circuit stays briefly energized, like an illuminated dot-to-dot segment—like an electric wall map of the New York subway system.

As the conscious stream flows into the cortex, making records, it typically leaves combinations of energized circuits together in the network. What happens when records are energized at the same time?

Energized records gather

Next, we'll see what happens as energized records gather in the cortex. At one time, incoming trajectories are typically a series from a sense, such as from watching the six o'clock news, and at other times, the trajectories are from a combination of senses, such as walking through a forest where birds are calling, squirrels are throwing spruce cones, and there are slippery roots under foot.

Try an experiment. Close your eyes and imagine you are listening to a television weather forecast.

As you listen, you focus, for the most part, on a series of trajectories coming into the cortex from a single sense. Now open your eyes and look around.

Now you can see the meteorologist, his pointer, and the weather map. You have incoming trajectories from a variety of senses. As these trajectories enter consciousness and the cortex, they join other energized records present, forming a combination that, besides these sensory experiences, may well include your thoughts and feelings. Were you planning a picnic? Is rain predicted? Did rain postpone your last picnic?

Later we'll see that the same process–from recording to re-energizing–occurs as thoughts and feelings pass through the thalamus.

Co-energized records fuse at common qualities

Let's look at a series of energized records originating from one sense.

Like the many drawings or cells that make up an animated Disney cartoon, a series of conscious instants–incoming sensory trajectories–shares many qualities.

In other words, the qualities making up one drawing of the "Lion King" are nearly the same as qualities making up the very next frame. The differences between successive frames can barely be seen when they are side by side.

Recording over time: making a chain of records

This trajectory reunites at the point where these energized records share a quality, at the same time. When many qualities are shared, the second frame of the animation sequence is like a dot-to-dot pattern that is nearly a duplicate of the first. So one fused circuit, having many shared qualities, is almost a duplicate of the next one. And a series of these nearly replicating records forms a chain-like circuit.

A closely related series of instants that comes into the cortex from one sense in this way is a temporal record. The series of records fuse, second by second, making a trail that evolves over time (temporally).

If a single instant is like a snapshot of a beach with big waves, then a temporal record is like a feature-length film about surfing.

And when you watch a scene of a movie–or an animated cartoon–the qualities of the background and the colors stay the same, second to second, from one frame to the next.

A lot of qualities are shared by the frames of an experience. Even when you add a new characteristic to an animated frame of film, you still have a lot visual qualities that stay the same as each frame's background.

Because the instants share so many qualities in the flow from a sense, there are numerous connections between the records, allowing energy to flow quickly between two records.

In the future, energy will flow swiftly through this series of records because many fused connections join one frame to the next. This series, in fact, acts as a unit–just as a series of frames making up an animated film is a unit. Because they have provided the steps to a resolution in the past, temporal records are especially important for the guidance they give if we have to perform a similar task in the future.

And again, as with any two or more records, unite at their shared qualities, because the common quality or qualities are part of both records.

And energy entering one of the records easily flows through to the other records. In this way, shared qualities act as windows or door for energy to easily flow through. After fusion, the membranes no longer retain energy; the doors, making a new circuit, are "open."

So when we watch an event, we make a temporal or time lapse record of what we see has happened to bring one state to another. Likewise when we listen to a song, we make a temporal record of what we hear, such as lyrics or a catchy melody. This temporal record might record how something is done, such as how bread is made, how a problem is solved, or how a stress is released.

Developing inter-sensory records

When sensory records gather, they, too, often share qualities. When a toddler sees and holds a book and hears the word "book," he or she matches the impacts of seeing and holding the book with the word "book" by fusing the potential qualities they have in common.

The "B" sound, for example, is solid, thick, and deep. This may match the weight he feels holding a book. The double "oo" sound encourages focus.

The sound is much like the "oo" in another word, "look," which is a major part of the relationship to a "book." Then, too, "oo" seems to match two eyes that are known for "looking," or two letter o's in the word, should the toddler be learning the alphabet.

All of these qualities help a toddler remember what a book is.

The same process occurs in other languages. In French, for example, book is "livre" and the sound of the word is like the sound made by pages flipping.

In the future, as with a temporal record, when energy flows into one of the component records (one of the components making the temporal record), energy will flow on into the other record energizing it, too. In this way, we learn that the word "book" is matched to the core qualities defining this particular object: a squarish object, with pages covered with words and/or illustrations, bound between covers.

Building the network: on core qualities

Because each subject is defined or formed by its essential or core qualities, we routinely look for qualities that are shared between senses. We routinely build on qualities that are in common, as when we learn a subject or a language. We routinely look for the inter-sensory qualities that define a subject even further.

For example, a stick figure is made up of lines that form the visual core qualities of a person. Of course, in reality fingers or toes are not the same width as a torso or leg.

But that combination of lines provides recognizable qualities, which let us add inter-sensory records that build breadth or density (comprehension).

And when we make a temporal record, we routinely attach component offshoots from different senses to the series, giving the experience greater fullness and additional links to the related information of other senses. The breadth and connections also provides routes of inter-sensory qualities that may be of use later. We can refer to them again, from many directions, as if they were entries in a mental encyclopedia.

To review, matching qualities among senses to form a larger record focuses on the common points where the inter-sensory concepts match. But unlike a temporal record, the energized records of two concepts are from different senses and their points of overlap are fewer. This record, then, is a spatial record. Different spatial records can be related through an interconnected temporal record of which they are both a part.

For example, this inter-sensory record is made when a record from one sense, such as hearing the word "book", energizes sounds in the network at the same time as a trajectory from another sense energizes a record of seeing or feeling "a book." In this way, the two records are fused or united by their shared qualities.

Context

This current character of the network is also important because our network of subjects serves as a backdrop-a background of records we can build into. In other words, specific information can only be added in, or learned, when there is a context-an existing network to build into.

How can we relate to a description of how valuable a green bozart is, if we don't have core qualities of a generic bozart established in the network?

Let's look at language more closely. As we saw above, language is developed in the network when we fuse the common qualities between a concept and other qualities with audio range and combinations of inter-sensory characteristics that we can relate to it.

For example, let's look at the concept cat and the English word cat and see what qualities they share. The sound of "c" in the word "cat" is soft like a cat's fur, but it's not as soft as the sounds of the word "kitten," a little cat–with both a soft "k" and the soft "n" ending.

Both "cat" and "kitten" are words, however, that have the "t" sound. The quality "t" as a written symbol has a sharp claw-like point. And as a sound it makes the sharp, hiss-like sound of a cat. The sharp "t" quality in a "cat" or "kitten" can also reflect their quickness.

Or we may think of a cat as "feline." "Feline" is a word that might emphasize the elegance or grace we see as a cat moves.

Each culture may assign or pick out certain qualities (within the series of sounds making a word) that are emphasized in a concept. Each culture develops language by

joining records between the core qualities of the concept and the qualities of sounds.

Or, a culture may borrow records from those developed in another culture. Cat, for example, derives from the Latin *Felis cattus*. As we've seen, when energy enters one of these joined records, say, the word part of the record, energy easily flows through the component qualities into the other records it's connected to and energizes them.

This borrowing of terms also explains why we learn a language. We need to identify the common qualities that another person will "recognize"–qualities that join a concept and pronunciation with the word to enliven those qualities in their network when they hear or see the word.

Personal character develops

During your lifetime, a unique network of records is steadily being built as trajectories enter or flow into the cortex. Each highly personal network begins before birth when a series of sensations and movements is connected as reflexive experiences. Through these experiences, subjects begin as scattered, web-like records. After birth, for example, babies seem to recognize sonatas they heard in the womb.

A subject in the network can be defined as a record that consists of a set of core qualities. The core qualities of a bowl, for example, are those qualities that apply to all bowls.

Among those qualities are roundness and the capacity to hold things. The edges of a bowl are higher than the bottom. How much higher determines the capacity. After we establish a subject and its core qualities, we often begin building density around the core qualities by attaching inter-sensory records.

So with a bowl we might build records of different-colored bowls of varying materials, such as plastic, porcelain or glass. This building a set of qualities into a record develops the network, attaching supplementary qualities to a bowl. Our understanding of the subject builds. When first encountering a colander or a sieve, we know it is not a bowl—

because, although it is round and deep, its ability to hold things is limited.

As with the unique character of the rest of our body, the personal network we develop is a unique and private part of our being. The mechanics or biology of forming records, like the mechanics or biology of digesting food, is the same for all of us.

However, the exposures we experience, like the lentil soup or lasagna we choose to eat, affect our growth and maintenance, causing our individual networks to develop in highly personalized ways. You and your network of records, although comparable to others in the physical makeup and manner of development, are different from all other individuals and their networks of records.

Later, we'll see how future energy converging on the record (a resolution) makes that record accessible; we can focus on it again, bring it back into the conscious stream and perhaps use it to propel a new resolution.

With accessibility, a temporal record of a bowl enables us not only to seek or use a bowl, but also provides records of how to make a bowl out of clay, for example. That is, if we understand what a bowl is, and have other records of the properties of clay, accessibility lets us use those records in deriving future resolutions.

When we are infants, the network of subjects begins accumulating and is structured with circuits that support our physiological well-being. These records relate to the details and skills that keep us alive, such as food, warmth and affection.

Then, as we experience more of life, we are exposed to a variety of subjects and use combinations of senses to flesh out the breadth and intricacy of the network. We seek out experiences that appeal to us. We experiment with a sport or poetry, for example. With time, our network grows increasingly complex and personal.

And we orient ourselves to the subjects that interest us, acquainting ourselves with more detailed definitions and relationships.

Then, because our network determines our thoughts and reactions, the character of the personal network we made develops our personality.

For example, if you are interested in the subject of gardening, you may know many more details and much more information about soil and seeds than about developing train systems across the landscape. We call this structure of subjects and interests that we continuously build upon "knowledge."

Later in life, we may experience moments of insight referred to as "the joy of learning"–when new connections (links) are made uniting separate parts of the network we've developed. Links let us recognize a fragment of a bowl at an archeological site.

That piece connects records of bowls to help us understand their existence and use in an ancient culture. Filling in the network between previously built areas of the network for the first time can be a source of satisfaction and even joy.

Balance "in" leads to balance "out"

Other people we are exposed to have an impact on the network we develop. Within the development of our personal circuitry, we develop a variety of social interfaces.

These interfaces make our networks (our memories, our minds) inter-accessible. Just as muscle forms a balance of stress and relief, it works from peaks of intensity to plateaus of relaxation.

At best, our relationships provide us with accessible resources and invigorating and relaxing energy patterns.

In this way, relationships help us develop access to resources, providing emotional relief, in forming a balance of emotional invigoration and relief.

Notes

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Chapter 4

Recognition and Orientation: When Trajectories Diffuse in the Network

To review, our personal set of records begins when the energy of trajectories through the thalamus fuses neurons together in the cortex. When energy diffuses in the network, we are oriented to past records. So when trajectories diffuse in the network, we experience a subtle sense of recognition.

Energy penetrates the network

Besides being used to fuse neurons, the energy of a trajectory penetrates and energizes the network.

Specifically, after the energy of a trajectory re-joins (sparks collide) in the cortex and builds a record (a distinctive little piece of network), the remaining energy sinks into the adjacent network–the surrounding network that the new record just fit into.

For example, if a trajectory coming in contains the quality "blue," energy sinks into the cluster related to "blue." And, remaining trajectory energy is sent to energize any past record having "blue" in it.

Through this routing of energy, any past experience having the quality "blue" as a part of its record is energized--making it, as we'll see in later chapters, potentially usable.

Energy brings past records alive

In this way, incoming energy relates current experience to past experiences, defining the relationship between the present and past.

This energization also explains how present experiences energize and awaken the records of past experiences. In fact, when current experiences energize the records of past experiences, those past records are now "on call."

Bringing past records alive is what happens when we relate to another's personality through communication. In other words, we use this process of energizing records to access the character of another person's previously developed network. We use mutually defined words to activate the areas of the network we have in common.

For example, if we hear the word "house," the trajectory activates a concept most of us recognize. But because the character of our networks is unique to each of us, the specific concept energized is unique to each of us. Even though we share common language, we don't always activate the same network.

Our context may be different. So, for example, the phrase "my home" likely will energize different network records, reflecting personality, in different people. If you mention "Grandma's house" to a sibling, common areas of network will be energized.

Depth of understanding

As another example, consider the word "horses." How deeply or how thoroughly this trajectory infuses into your network depends on the amount of energy it carries and the nature of the network the energy is able to sink into.

So if you are a veterinarian who works with horses, or a jockey, the depth of your knowledge will be far greater than the knowledge of someone who encounters horses only in magazines. If a baby sees a horse for the first time, he may call it a "dog" because that's the only four-legged animal he recognizes.

If the incoming trajectory of the word horses sinks in well, you experience a sense of understanding. In other words, a good infusion confirms the word horses and it has meaning. But if we hear the word "chloromak," the trajectory probably doesn't go very far into our networks. Because you don't recognize or understand it, chloromak doesn't mean anything to you.

This lack of meaning occurs where there isn't much energy in the trajectory, and the energy doesn't penetrate. Or, as is likely in this case, the lack of meaning occurs because there's no related network for the trajectory to sink into.

Without the network for the trajectory to sink into, the word doesn't have the context it needs to give us the ability to recognize or understand.

In other words, when we nod acceptance or say we understand or recognize something, or that it means something to us, we're saying the trajectory fits into its surrounding network well.

We are able to connect the new trajectory (often a sensation) with (into actually) what we already know or have experienced.

If we don't get that sense of understanding, we often purposely repeat the trajectory to pump more energy that will further penetrate the network.

The energy is sent out to search the network for a sense of recognition, orientation, understanding, or something to connect to the new information. For example, when we ask someone to repeat what has been said, the network is penetrated farther as we try to recognize or "place" the concept we heard. Or we may ask to be provided a photo of a horse or a definition of an unfamiliar term such as "chloromak."

In addition to giving us recognition and orientation, the energy of the trajectory in the circuitry does more.

Energized areas: current orientation

As the trajectory of each conscious instant sinks into the network, it energizes a particular pool or area of the network-its related records.

This area is called the "activation pattern" of a trajectory in the network. Because it contains energy that may be used later to propel a new trajectory, we can say this pool of records is on call.

Energizing activation patterns orients us (our personal experience) to the current conditions we are exposed to from our body and the environment around us. In this way, we are constantly updating our personal network, or keeping ourselves in a state of "active orientation."

So we've seen that energy coming into the network places all energized records on call.

Because of the added energy it contains, a trajectory has the potential to be used in forming a new trajectory. Routinely, in fact, trajectory energy is used in this way. And because trajectories constantly enter and gather in the network, we routinely energize combinations of activation areas.

In this way, during our waking moments, incoming energy from the stream of consciousness constantly keeps combinations of the network energized.

Overlapping activation pools

Incoming trajectories constantly enter the cortex, and pools of penetrating activation patterns often overlap, like washes of color in a watercolor painting. Next we'll see how energy in these combinations of activation patterns often overlap in the network and resolves.

We'll also see how this pattern of converged energy leaves the network and sends a new trajectory to the thalamus, putting a thought into the conscious stream.

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Chapter 5

Forming Thoughts: Resolving in the Network

Thinking, of course, is one of the most personal things we can do. We know a lot of what we think is based on a variety of past experiences and is frequently related to new information we recently absorbed. So this part of the conscious stream relies on what we've recorded in the past and its interaction with what we take in, in the present.

When combinations of trajectories converge in our personal network, and send a trajectory to the thalamus-we experience a thought. In other words, incoming trajectories activate records of past experiences. And combinations of these activated records converge to cause present thoughts.

Specifically, we'll see in this chapter how energy in a combination of activation patterns overlaps, defining and highlighting a pattern in the network. When energy accumulates in this pattern, the energy propels a new trajectory out of the cortex to the thalamus. This trajectory from the cortex to the thalamus places a thought into the conscious stream.

The particular thought depends on the character of the overlapped pattern in the network. This process is how we remember, reason, predict, plan and perform other mental work, as well as how we decide to take action.

Resolutions

Take a moment and visualize a "sky." When you do this, you make an activation pattern of all the records you've made that contain the visual "sky." Now think of the color "orange." Another activation pattern of all records having the color "orange" is energized, from orange juice to clay tile roofs.

Where does the energy in these two activation patterns overlap in your network? In other words, what do you think of when you hear the words "sky" and "orange" together? In short, how and where the activation patterns resolve in the network shows their relationship.

Often the words "sky" and "orange" resolve in an overlapping pattern that is the thought of a "sunset." The overlapped energy from the trajectories of "sky" and "orange" on a pattern in the network propels a trajectory to the thalamus, often putting a thought of a sunset into the conscious stream.

The thought that's propelled to the thalamus defines the relationship in our particular network between these two subjects or concepts-colors, in this case- as we've experienced them together. In this example, the activation pattern of sky and the activation pattern of orange overlap where they both resolve in the pattern of a sunset. Adding more activation patterns changes the character of the resolution trajectory.

For example, we can add a trajectory leading to another activation pattern to generate expression. If I ask you to share your thought of a resolution of orange and sky with me, the verbal response that follows, in English, is the spoken word "sunset."

What we just experienced was an example of diverging energy followed by converging energy (converging trajectory) in the circuitry. Through diverging and converging energy, simultaneous trajectories of conscious information are resolved in the network. To review, the concentration or convergence of energy in a pattern propels a trajectory forward. The nervous system works best when it's able to

resolve energy patterns—which maintains propulsion. Otherwise, we "lose our train of thought."

Network enrichment

Let's look at some conditions that affect how trajectories are resolved through the process of thought. Besides the combinations of activation patterns or trajectories involved, and the energy they contain, a resolution depends on the network available.

To achieve a resolution–an overlapping pattern–we must have a network that will resolve the current combination of activation patterns. So when that network is not available, we can, and often purposefully do, build new network that will resolve the activation patterns.

For example, if you'd like to grow a garden some day, in addition to gaining firsthand gardening experience, you may start learning more about growing a successful garden. For example, you may study soils, chemical balance, genetics, growing seasons, varieties, climate zone, weather, environmental complements, budget and labor. Confronting these topics rudimentarily early in life gives us a ready reference when we face them later in life.

Then, in the future, when those resources are available through the network and you do grow your garden, you have created a network that is available to provide resolutions. These resolutions consist of answers or more precise answers where there were none before–answers that will better ensure success as the gardening project unfolds and a variety of needs arise.

In effect, we also extend our network, when we use language to communicate with someone. When we share our network–our knowledge–our joined networks may result in a resolution that we would not have obtained otherwise. So when we call a friend for some gardening advice, we may be able to extend the knowledge we both have about giant tomatoes, for example, to change the other person's network, or experience—as well as to grow bigger, tastier tomatoes.

Number of activation patterns to be resolved

The particular breadth and depth of our network is a major factor in our ability to overlap-to find or derive a resolution to incoming trajectories. The specific number of activation patterns to be resolved, is another.

Consider the activation pattern that results from this request: "Please tell me what summer weather is like?" This question provides too few factors–too few activation patterns–to find a resolution. When the energy in the overlapped areas is too spread out, there isn't enough concentrated energy to form a clear propulsion pattern to the thalamus.

Now consider how you would answer this question: "What's the weather like around Mt. Shasta in northern California in July?" The added trajectories (place and season) with their succeeding activation patterns provided by incoming energy from the conscious stream provide a tighter overlapping pattern that concentrates energy and therefore propels a more precise thought. The resolution is narrow enough to send a more focused propulsion to the thalamus.

So within a particular network, the precision of a thought that results depends on the number of activation patterns involved and the number of trajectories to be resolved together. Thus a general question may be more difficult to answer well than a specific one. Because the trajectories must resolve in the network to propel a trajectory, the nature of the network determines the nature of the resolution.

Energizing network further: extending pools

Another way to reach a resolution when one doesn't come quickly is to pump more energy into one or more of the activation patterns in the combination. We do this when we ask someone to repeat a question, when we ask for definitions of terms used or when we turn a concept around in our minds. No matter which method we choose, we spread energy deeper into the network, energizing more area. The

activation pool expands--increasing the possibility of an overlapped area–and a resolution may evolve where there was none before.

On the other hand, sometimes too many strongly energized trajectories cause a congested combination of activation patterns, which stalls a resolution. It's like traffic backed up at a highway exit. Taking out some of these activation patterns may leave us with a clear overlapped area that removes the blockage. Or if there are too many activation patterns, we may separate them into smaller combinations, (create several exits, so to speak) and then resolve them, each in turn, until all activation patterns are resolved.

In this process, we may also find that we need to change a combination. We may need to take out and add. Once congesting or unrelated activation patterns are taken out, we may need to gather new trajectories so that we can develop new network around one or more of the current activation patterns. As a result, when we do this, we may discover that we are reaching a resolution. (I had to do a lot of this to make progress in this study.)

In summary, when too many high-energy trajectories can't be resolved, we may be able to recognize, separate, prioritize, remove, add, develop, and resolve combinations in turn to get resolutions. We call this process thinking through a problem.

Comparing thought and sensation

To review, from Chapter 2, a series of energized clusters to the thalamus make up an experience—a sensation, thought or feeling. For example a sensation experience is made up of the superimposed impressions from a sensory tissue to the thalamus.

Why do thoughts seem more private, more intangible, and less vivid than the experience of a sensation? The vividness of experiences that begin with our eyes, for example, is due to the relatively large number of energized clusters

that form the energized trail between the retina (or any sensory tissue) and the thalamus. On the other hand, the cluster trail between the cortex and the thalamus (for a thought) is a trail made up of fewer activated clusters. It's an experience formed by a shorter number of energized clusters (superimposed impressions) than a trail from sensory tissue to the thalamus.

Although a thought seems less vivid than an immediate sensation, it's a distinct and strong element of the conscious stream. The clusters making up the trajectory from a sensory tissue to the thalamus are more than those from the cortex to the thalamus, but the impact of a thought in the conscious stream is as distinct as that of a sensation.

Comparing memory and original thought

We've seen that converging trajectory activation patterns propel trajectories to the thalamus and are experienced as thought. Now let's look at two different categories of thoughts that are made by the particular combinations of activation patterns converging in the network (before directing a trajectory to the thalamus.)

The first category is a memory, which is a thought that occurs when a combination of activation patterns in the network overlaps on a previous record. When the trajectory from that record is propelled to the thalamus, the original (pre-recorded) experience is reconstituted when the component qualities of the specific experience we had in the past are re-energized. In other words, as the trajectory from a record enters the thalamus, we "remember" or re-experience in our conscious stream the previous experience that led to the record.

The second category of thought—an original thought—occurs when a combination of activation patterns overlaps on a new pattern in the network. An original or creative thought enters the conscious stream. When a fresh or creative resolution of activation patterns occurs in the network, we are using our "imagination."

Two kinds of resolutions lead to two kinds of creative thoughts: "present" and "projected."

A present thought resolves a set of conditions that are present. This resolution of activation patterns that define current conditions, exists now. In other words, the convergence of these activation patterns defines what we have or what we know now.

A projected thought, on the other hand, is the resolution of activation patterns that includes potential (as yet, unobtained) conditions. For example, a resolution of the phrase "if you had this, you would get that" is a projected definition.

In a later chapter, we'll see how a projected resolution that stays active in the network acts to guide us through an activity–to bring a projected resolution to an actual or present resolution. In other words, we'll see how an activity, in stages, makes all conditions of the projected resolution come into existence.

Theoretically, when we fill in the "ifs" or uncertainties, making them current, we bring the projected solution or resolution into a current state–the present state of what was projected. For example, if I had walnuts, I could make brownies (and I can make that "present" if I drive to the grocery store for the needed ingredient.)

In any case, the character of any resolution depends on the network. The character of the network determines the particular character of the resolution to the thalamus. What comes out depends on what has been previously recorded.

Recording thought generates thinking

What happens to the trajectory, the thought, at the thalamus?

Like any other instant in the conscious stream, the new thought goes (back, in this case) to the cortex, where it is recorded. As the thought is recorded, it connects with the common qualities of other current active records.

These connections during recording explain how our older thought becomes related with and connected to newer circumstances.

At the same time, when thought, as a trajectory, is propelled back to the cortex, it contributes to the current combination of activation patterns and its resolution.

In this way, a thought commonly affects the character of the next thought, which also goes back to the cortex. And, this new combination of activation patterns, in turn, can resolve onto yet another thought, perpetuating a kind of cycling we call thinking.

Dreaming

During our waking hours, we cannot resolve all incoming energy. The residual energy accumulated when we're awake remains in the network and takes on another form of cycling when we fall asleep–dreaming. In other words, not all the cortical network resolutions occur during waking hours.

While we sleep, residual energy in the network is resolved through dreaming when leftover activation patterns merge through the paths of least resistance, the routes made by previously formed records. These resolutions, like thoughts, become part of the next active combination, which in turn often goes back to resolve again, and so on. This process unfolds as dreams—during the rapid eye movement stage of sleep.

When we are asleep, there are no current external properties to keep the combination oriented to the current environmental exposures. And because the energized leftover activation patterns are scattered subjects or parts of subjects that weren't used to form resolutions during the day, dreaming has a relationship to reality that is less distant than thinking during the day. Through dreaming, we resolve leftover energy that's been absorbed by the system.

On to feelings

If we look again at the analogy of consciousness as a reel of film, we have just described the second type of film frame–a thought–on the reel of consciousness. We'll continue to follow energy as it brings the third kind of frame–*feelings*–into the conscious stream.

Notes

Notes

Chapter 6

Developing Feelings

We've seen how sensations and thoughts enter the conscious stream. Now let's see how feelings enter it. This knowledge of what causes feelings is what I was looking for as a youngster, and the search for answers has, year by year, driven my commitment to developing this model.

What causes feelings? At the simplest level we'll see how feelings are a form of orientation--orienting the body to thought and sensory experiences. Later, we'll see how these body feelings we know as emotions reflect stages of resolving activity in the nervous system's circuitry.

Specifically, in this section we'll look at how feelings are formed and dissipate, one after the other. Then, we'll see the effects we experience when feelings are prolonged and when they become compounded. And we'll see how the subtle interplay of simple, prolonged and compounded feelings reflect the circulation of activity in the circuitry. Finally, we'll see how this interplay leads to forms of expression and behavior.

Deriving reflective stress: subtle muscle feeling

Feelings begin when a combination of trajectories into the network overlap and send a trajectory to muscle. The kinds

of feelings we commonly associate with emotion are formed as trajectories that stimulate patterns of muscle tension. The muscle tension patterns are most often experienced in the face, chest or arms, but are also experienced in other parts of our muscle landscape. The result is a steady stream of subtle but distinct muscle sensations.

Let's look at the two kinds of trajectories that come together to form the activation patterns that, when overlapped, result in a trajectory that goes to muscle tissue and give us these kinds of feelings.

The first trajectory type is generated from neurons in our muscle landscape. These trajectories continuously express subtle muscle position and tension patterns through the conscious pathways into the cortex. Consciously, they give us a sense of having a three-dimensional nature.

The second trajectory type is generated from sensation or thought trajectories, through the thalamus.

To review, the trajectories from the muscle landscape-reflecting position and tension-are constant steady trajectories in the conscious stream. The tension pattern of the muscle landscape changes with each increment of natural muscle movement-from fully at ease to completely tense.

At the same time, sensory clusters in the muscle express a corresponding tone–one that is sent into the conscious stream and cortex.

The single muscle tone that results when muscle is in a certain position is like the sound a trombone makes at a point along its range. And, the successive tones of a muscle as it moves through its extension is like the changing tones we hear as the long, cylindrical tube of the trombone is extended. For both a muscle and the trombone, the tone differs at the halfway point and the end of extension.

From infancy, humans make elaborate records of muscle tension variations. When our body makes reflexive movements, records are made to correspond to a muscle's position and the tone that position generates. These tones

range from sharp and high pitched as muscle tenses to easy and mellow (and diffuse) as it relaxes.

The tension tones continuously form activation patterns, like haloes of energy in the network. When these activation patterns overlap with activation patterns of the second type of trajectory, a thought, they converge and resolve in the network. The trajectory resolves on the same qualities and the shared energy accumulates to maintain a focused trajectory.

In other words, when the activation pattern of a sensation (or thought) converges with the activation pattern of a muscle in the areas where they share a pattern of tones, a trajectory is formed.

This trajectory is propelled from the network to muscle and the sensory receptors there. Specifically, the muscle tissue is stimulated to duplicate the original tension, corresponding to the shared pattern of tones. This stimulated muscle, in turn, causes the resulting muscle sensation to enter the conscious stream and be experienced as a feeling.

This resolution is constant. So each sensation and thought that enters consciousness automatically generates a muscle tension pattern.

In this way, each sensation in the conscious stream is followed by a reflective feeling in the conscious stream. And the same is true for each thought that enters the conscious stream. In either case, the tension pattern that creates the feeling is, in effect, a reflection in the body of a particular thought or sensation. Because each sensation and thought naturally generates a tension pattern that reflects its corresponding qualities to muscle, we can call the tension pattern its reflective stress. These feelings--subtle muscle experiences--in fact take up a large proportion of the conscious stream.

In comparison, reflexive stress occurs; if a drop of rain falls down our collar, our shoulders hunch. If dirt blows into our right eye, the eye shuts to prevent further contamination and discomfort.

Reflective stress example

The following simple experiment will illustrate the reflective feelings we experience following a visual sensation. Bring your finger up to your face about one inch from your cheek. Now draw an imaginary circle near your cheek. Do you feel a subtle muscle tension pattern moving on your face? A little ache?

Now change that drawing to an "x" in about the same place, and slowly bring the bottom of the "x" down to your chin. Do you feel the difference between the reflection of the circle and the reflection of the "x"? Can you feel (not just see) that you have your finger next to your face?

Reflective stress is so subtle that we barely notice it in the conscious stream. But we take for granted that our body is being continuously oriented--second by second--to our conscious stream of thought and sensation. While reading this chapter, you may shift your sitting position a dozen times, or sip a glass of grape juice. But you still stay tuned to the message on the page.

For a more dramatic example, consider the reflective stress of sound when you hear someone shout "Stop!" When the sound is loud and curt, its intensity and sharpness profoundly stimulates a muscle at a single tension tone.

The sustained pressure on that muscle, in effect paralyzes that muscle. Did you stop when you heard "stop!"? This response may be needed to halt a child who is on the verge of running into a busy street. In any culture, in fact, a sound expressing alarm is initiated to automatically isolate and stress muscle. A shout (or any unexpected loud noise) causes a burst of intensity to be reflected to muscle. So the intensity of the reflexive stress interrupts the synchronized movement that is occurring, such as walking or talking.

Music is composed to produce tensions that cause tones. Rock and roll stimulates muscle leading us to tap our feet or dance. This type of music is popular with those who need to express excess energy through muscle, who enjoy moving to rhythm or who want to change or replace current feelings of muscle stagnancy or disuse. As we age, the muscle in our

muscle landscape tends to ache more, causing "noisier" muscle sensations.

For that reason, as we grow older, we tend to prefer mellower, non-jolting music which sends trajectories that tend to soothe and warm muscle-smoother easy listening or classical music, for example. We choose to listen to music that stimulates us in the manner we prefer–that soothes and doesn't jolt, Mozart rather than rap or rock.

As another example, to get the reflective stress of a thought, think of a sunset you've seen. Now, if you relax with that thought in mind, the intensity of the color you see will probably cause a warm reflective feeling in your body-a feeling that is different from the feeling you would experience if you were visualizing a Sierra waterfall.

The automatic reflective stress that causes ever-changing imprints on our body's muscle landscape is a form of orientation that can also be protective. When our body's muscle is stressed, movement is inhibited, acting as a built-in restriction. For example, the reflective stress of walls and people around us keeps us from bumping into them as we walk along a hallway.

Relating reflective stress to movement

Reflective stress is felt when a single trajectory is being sustained on a muscle. It energizes the muscle in place. On the other hand, a synchronized series of trajectories to muscle generates the coordinated movement we more commonly associate with muscle movement–such as picking up something.

In terms of our overall physiological health, reflective stress stimulation is healthy and invigorating in the same way that stimulation of larger muscle groups that provide movement is necessary for health. If any muscle tissue, even fine muscle such as the muscle generated by a sensation or thought, is not regularly exercised, it can degrade with disuse. To keep tissues healthy, the stimulation of reflexive stresses is important.

To keep the mind alert, to keep the reflective and physiological stresses (initiating movement) in order we may begin new activities, such as birding in a nearby park or learning to play a musical instrument.

To review, as we are constantly exposed to the sights and sounds of our environment, and as we generate thoughts of our own, we continuously experience subtle feelings. This constant use of reflexive stress is how the nervous system relates thought and sensory information to the body's muscle landscape. In other words, this is how the nervous system inter-orients and integrates activity in the body so that we can function as a whole.

Relief

The natural counterpart of muscle stress is its release. We feel not only a muscle's stress–but also its release.

Although the tension of reflective stress exercises our muscle, muscle also needs relaxation. Rest allows the tissue to be replenished with oxygen and nutrients. Tension on muscle can be released when the combination of activation patterns that generated the reflective stress ends. Or, it can be released when the energy is used–in a combination of activation patterns–to form another trajectory.

One way to get a resolution is by changing the activation pattern combination, which will change the resulting trajectory. If you are looking at an eagle and the eagle flies out of view, the combination that generates the reflective stress of the eagle is no longer present–so its reflective stress also fades.

And in the cases of our reflective feeling example, when your finger leaves its position in front of your face, the reflective stress ceases. The visual trajectory no longer energizes the activation pattern set that formed the trajectory to stimulate the muscle. So when the stimulation stops, the muscle relaxes, and when the stress fades away, we experience in its place a subtle, sensual feeling of relief as the tension loosens.

The same stress-and-relief pattern is true for releasing the reflective stress of thought. For example, if you think of a sunset, you'll experience its reflective stress until the thought fades.

Let's look at the relief. If any of the activation patterns that brought a thought to the thalamus no longer exist, a reflective trajectory no longer stimulates the muscle. In any case, when that stimulation stops, we feel a degree of relief.

The particular degree of relief varies, depending on the amount of tension released. The relief felt by the release of a prolonged thought can be just as relaxing as the sense of relief we get when an intense sensation stops. Both are based on the release of significant muscle tension.

The reflective stress (that follows a thought) is often used–as it enters the thalamus and moves on to the network--in the formation of a new combination of activation patterns. This new combination, in turn, frequently propels another resolution.

As a result, the stress on the tissue is lifted as the energy of the trajectory continues to circulate. In other words, the energy of the reflective stress flows from the tissue, venturi-like, as a part of the next trajectory formation, and enters the thalamus and network. It's used to form a new combination that generates a new trajectory. Stress to the muscle is no longer sustained because the energy that stimulated it has "moved on."

Another way we can dissipate accumulated energy (to achieve relief) is to relax muscle through expression. Expression and other forms of behavior release the pressure of stress because energy has some place to go. This energy is used to move muscle; it takes a route available. Sometimes we express ourselves just "to get it out of our system." The "it" here is the unresolved, unrelenting (emotionally painful) reflective stress.

Expression is often relieved at the same intensity as the stress that is felt. For example, if you hurt intensely you might shout intensely–as in the primal scream therapy sometimes

recommended for women in labor. In this way, expression is like a pressure relief value.

Intensity of relief

The feeling of release is a very important part of conscious experience. In fact, we often intentionally build up tension just to get the release. We are often attracted to–and plan activities–that build stress just for the fun of experiencing the release.

A baseball game is an activity of restriction with a restrictive form, rules, that sets up a series of challenges.

Building stresses and unfolding releases make baseball enjoyable. These processes are repeated in ballet, too. The stress is the beat of the music and the challenge of matching formal positions to that beat. The release is the breaking away, providing the subtle pleasure of letting go.

Often the greater the stress, the greater the relief. So some of us are inclined to seek activities that build significant stress just for the impact of significant relief.

As another example, quiz show questions build up stress, which is met with relief when the contestant know the answer. Another form of relief is generated when the TV viewer knows the answer—but the contestant doesn't.

The energy of prolonged stress

Sometimes, when a sensation or thought is intransigent, reflective stress is extended beyond what is comfortable. This constant stress keeps tissue from replenishing itself with rest and nourishment. And when the energy on the tissue doesn't "move on," the tissue is continuously re-stressed.

Over-stimulation, in this way, keeps muscle from functioning well; the muscle fails to get the rest, replenishment, and oxygen it needs. There is no movement of energy. And as with all tissue, over-stimulation eventually injures its integrity. And the effect on consciousness becomes pronounced.

The intense reflective pattern causes a lack of replenishment and the accumulated energy on the tissue in turn causes a painful physiological deficiency experienced in the conscious stream. The orientation isn't subtle anymore. When the unrelenting reflective stress comes from an unresolved thought, the excessive reflective stress is felt as emotional discomfort or distress. Continued stress in the conscious stream becomes emotional pain.

What happens when resolutions are restricted? At its extreme, this stagnancy may debilitate or be damaging to the tissue. In addition, this worn-down tissue causes us to have less overall energy to tackle other needs of the day.

For relief, extreme emotional distress can generate expression or behavior of corresponding intensity, that is aimed solely at getting relief . . . at getting the discomfort "out." Our nervous system reacts reflexively through any route available to move the intensity out. At best we may go for a challenging run or even pound pillows—routes for relieving stress that aren't personally or socially abusive.

Overall, at the circuitry level, both over-stimulation and lack of relief block the circulation of energy and prohibit the relief of reflective stress. Both blockages prevent other needed resolutions from forming and fading in the circuitry at a beneficial rate. They inhibit the best level of nervous system work, and should be moderated to maintain emotional health.

Maintaining and incorporating balanced exercise

To review, one way in which reflective stress is relieved is when the sensation or thought that initiates the reflective stress changes. Because we are always moving around our personal environments, we are naturally continuously changing the sensations we absorb (and their subsequent reflective stresses).

In fact, we are continuously invigorating and relieving muscle tissue as reflective stresses or sensations come and go.

Similarly, the reflective stress of thought invigorates and relieves muscle tissue. The reflective stress of each thought needs to be relieved, and often is relieved when we derive

another thought. As the stress of the first fading thought relaxes, the new thought then generates its reflective stress, which exercises tissue elsewhere. And at best, these changing states give us the gentle patterns of feelings that parallel healthy circulation.

To maintain this circulation, we practice adjustments. When thoughts are "stuck," and there is no resolution, we intuitively add and take out trajectories to change the sensations we experience. Or, we can change the current activation pattern combination to in turn change our focus or the content of the combination. These new trajectories enable us to derive different resolutions and the reflective stresses that follow.

Some common ways that have been use to change the activation pattern set (that may derive a new resolution to replace a stuck thought) are: changing positions, drinking a glass of water or taking a proverbial "walk around the block."

Overall, as stresses are released, exercised tissue is renewed and new sensations and thoughts come into the conscious stream. When the reflective stresses of the new thoughts take the place of those that have faded, the cycle–*circulation*–continues. This coming and going of reflective stresses provides a sort of refreshing massage to the body.

Prolonged stress

Let's look at some of the emotional consequences of prolonged accumulated reflective stress; at what happens when the energy of reflective stresses steadily gathers.

Think about times when you have been "bored" or felt the need to change what you are doing. The experience of being bored is created when a thought or sensory absorption doesn't change or changes very little.

When this happens, the same reflective stress is repeated on a muscle. The steady trajectory to muscle feels unrelenting, and the tissue becomes fatigued. In fact, the constant stress may cause us to feel as though something is boring into

our muscle. And that can be just as intrusive–just as painful–as unrelenting physiological stress, such as from hunger.

Boredom, in other words, can also be as painful as the sensory experience of being steadily poked in the arm, or having to stay in a room too long.

A stress pattern is prolonged when a sensation is repeated, or absorbed, for an extended length of time. A stress pattern is also prolonged when an activation pattern set stays the same, deriving the same unrelenting, potentially obsessive thought. As the trajectory continues, energy accumulates in the tissue and the level of stress increases.

If the reflective stress comes from a projected resolution, we experience the feeling that we refer to as needing something.

Let's review. A projected resolution is a thought that resolves a current combination of activation patterns. And when the intensity of the incoming sensations or thoughts of that pattern increases, the thought–as measured by the intensity of the reflective stress it generates--becomes more intense, or stronger. The need we perceive becomes stronger.

In other words, the accumulated energy that passes on into the convergence in the activation pattern combination goes to the reflective tension pattern. A stronger reflexive stress pattern of need can begin to dominate the conscious stream.

The more incoming intensity experienced, the stronger the reflective stress we feel as muscles tense. And if this pressure doesn't let up, the factors of the activation pattern set aren't changed. Remember that such change is needed for relief. So, unrelenting reflective stress, even subtly experienced, is a signal of need.

This signal is felt in our body's muscle tissue. And when the tension is high, the signal means we strongly need relief. We need to remove the prolonged strain of the reflective stress.

A feeling of steady reflective stress creates an ongoing conscious reference of the need to resolve the thought or eliminate the sensation that is causing it. Because reflective stress refers to something that generated it, that something is what needs to change to produce a change of reflective stress. Men on a chain gang breaking rock may sing to relieve their stress. A typist in an office may crack a joke.

Prolonged stress increases activation area

We've looked at one way that the energy of our feelings is used: When the intensity of reflective stress enters the conscious stream, it pushes energy deeper into the network.

The energy, in effect, enlarges the energized area of the network–like pouring more pancake batter into the skillet. Increasing the area of the energized network makes more network resources available for possible overlapping and deriving a resolution. The resolving trajectory can be found in territory where there is enough converged energy to propel a trajectory outward.

So, when reflective stress increases, the network area accumulates energy. That energy can be used to provide a means for finding a resolution, which releases prolonged stress.

We routinely and intuitively open up more areas to get a resolution when we repeat or emphasize a word in a sentence. By increasing the intensity (energy) into the cortex, we are expanding the activation pattern surrounding the word. The expanded activation pattern increases the likelihood of a convergence with other current activation patterns that will yield a resolution.

Prolonged stress leads to new networking

Another way to obtain relief from prolonged stress is to learn more about a subject, to develop the network for more potential overlapping. Adding new records to the network alters the combination of the activation pattern, which may

increase the likelihood of a resolution. Having more network routing available also increases the possibility of a more precise or more accurate resolution–a better solution.

Alternatively, expanding the network may result in a more precise or accurate definition of the problem. In effect, new networking (more resources) may provide us an opportunity to create a new, more-focused trajectory to relieve preceding stress.

Another potential way to find relief is to ask a question. Consulting an expert puts new waves of energy into areas of the network–again developing and opening up more network for a new resolution that potentially provides relief. So, in addition to intuitively, we often intentionally try to expand the activation patterns we already have to find a resolution that brings relief from the sustained reflective stress of a thought.

As examples, a bored person in a waiting room can ask, "Do you have anything I can read?" A bored child might ask, "Could I ride my bike in the park?"

In the last chapter, we saw that dreaming resolves the energy of trajectories we absorbed but didn't resolve when we were awake. So another way we release unresolved reflective stress is through dreaming. During sleep, our still-energized network forms a projected resolution that sets a story in motion–a dream. As a dream unfolds, energy moves and dissipates.

This release allows us to wake up physiologically and emotionally refreshed. Dreaming (including day dreaming), in other words, leaves us with a sense of starting the day with "a clean slate."

Superimposing reflective stresses

We have just looked at the effect of prolonged reflective stress and its release. Now let's see what happens when reflective stresses are superimposed, or overlap, in the body's muscle tissue. What are the emotional consequences–the feelings?

To review, the reflective stresses of sensation and thought are sustained for a brief time (longer than the relatively quick flash of sensation or thought). Because these stresses are slow to fade after they have been stimulated, we often have the reflective stresses (muscle tension patterns) of both sensations and thoughts active at the same time.

And because both sensation and thought can express reflective stresses to the same muscle, their reflective stress tension patterns can overlap. When this happens, the accumulated energy on matching patterns causes the muscle to send a more intense trajectory into the conscious stream.

As an example, think of something in the room you can't see but know is there--such as a blue cup or mug in a cupboard. Of course, when you have a thought of a cup you automatically get a reflective stress pattern of the core qualities of a cup–those aspects of a cup that all cups have.

Now you're going to look around for that cup. Remember, as you casually look around the room, you are forming reflective stresses of each sensation you absorb. When your eyes finally see a cup, the reflective stress of the cup goes automatically to your body (just as the thought did). This reflective stress instantly superimposes on the same reflective stress already there from the thought of a cup.

The doubled-up reflective stress patterns now generate a trajectory that reflects the core qualities of both the thought and the sensation into the conscious stream. In other words, you are matching the core qualities of the cup in your mind–the thought–with the core qualities of the cup you are seeing–the sensation.

The added stress of superimposed energy causes us to maintain a steady focus. In other words, the superimposed muscle tension causes muscle to stay in a firm position which allows us to continue to absorb the particular sensation we are oriented to. In this case, a cup–that caused the added stress. The extra stress holds the muscle in place to sustain your focus.

One interesting aspect is that along with absorbing the core qualities of the cup in our environment, we receive the extra details that are drawn in as the sensation is absorbed.

For example, if you think of a cup and see a blue cup with ivory stripes, in addition to the core qualities of the cup, you absorb the blue lines, the capacity, curvature of the cup, and maybe its contents--or emptiness. All these detailed qualities also enter the conscious pathways (causing new recordings and activation patterns).

Now the cup gets top billing in the conscious stream, and the resulting activation pattern that's energized in the network is a current activation pattern. This current thought may well affect the next trajectory–determining, for example, whether you pick up the cup, go to the kitchen, and brew a hot drink.

If the thought of being thirsty preceded the thought of a cup, the intensity of thirst would strengthen the thought of the cup and its reflective stress. Reflective stress in this instance could be the need you feel to pick up the cup.

Now, of course if you are not exposed to a sensation–if a sensation that matches the thought's reflective stress isn't absorbed–no energy superimposes or overlaps on muscle. In this case, what you're looking for is not drawn into the conscious stream.

Through the effects of superimposing reflective stresses, thinking of something you want or need acts as a net. You use that net to highlight specific information from your environment. This information brings in added energy to propel trajectories and maintain activity, as well as to provide fodder for record-making. Superimposing reflective stresses is an important way that the nervous system functions to get specific information needed to provide resources--to maintain circulation.

Excess stagnancy

Stagnancy can be beneficial to the nervous system circulation because the energy that is gathered is what may

be the force needed to propel toward a resolution. Feeling a "need" can be a common and useful stagnant emotion.

But what happens when we loose good circulation–when circulation starts to stagnate excessively? A variety of emotions may evolve as stresses are prolonged or become compounded. In this case, when circulation is "stuck," emotions often become more intense, perhaps even obsessive.

These conditions sometimes occur when reflective stresses are not released in a timely way. Reflective stress often naturally fades away when the originating sensation or thought ceases. Or reflective stress fades from consciousness when the stress moves on and its energy contributes to a new trajectory.

Sometimes, no other situation arises. But if too much stress gathers, we may feel encumbered or overwhelmed. The accumulation of energy crowds the conscious stream which slows down propulsion. In addition, an unresolved stagnant may cause unrelenting stress which may damage tissue when tissue doesn't relax and absorb nutrients —causing emotional (and sometimes physiological) distress of varying intensity.

The variety of emotions we're familiar with evolve in different ways. Each emotion has a "story" that brought it into being. In general, this evolution of an emotion leaves a resolution that is not focused enough (unfocused trajectories) or is excessively focused. Some unfocused circulation "stories" end up like knots or frayed ends. The emotion of an unfocused resolution may vary from vaguely to intensely uncomfortable.

Too many unfocused patterns can cause disconcerting feelings of disorientation or dichotomy. A stagnant pattern of excessive focus can also be mildly distressing to intensely painful.

Continuing stresses either prolonged or compounded may increase subtle damage to tissue, and the resulting pain further entrenches the troubling emotional pain present. At

the same time, any other physiological pain or distress present adds to the compounded pain. Feelings, such as frustration, disappointment, regret, rejection, disorientation, guilt, and confusion can be experienced when circulation becomes intransigent.

When these tensions, or combinations of tensions, are extended, secondary emotions evolve. Feelings related to this loss of a secure circulation or focus develop. These feelings include vulnerability, powerlessness, and incredulity—with emotional eruptions that may lead to rash acts that dump stress. Breaking dishes or punching a pillow are examples. In extreme situations, acts of vandalism or serial violence are examples.

Expression

Stagnant energy needs to be released. To move energy, we often diffuse the "pent-up" energy through expression or behavior. So the energy of emotional developments, besides causing degrees and varieties of feelings, often generates expression and behavior. In other words, intransigent emotions can just be felt, or they can generate expression.

Prolonged and superimposed reflective stresses can be released reflexively through facial expression or even by shouting. Or release can occur following extended stress—by tears of joy, or shouting hooray or whoopee, for example.

On to how feelings drive activities

We've found that, besides generating emotion, stagnancy is a signal of built-up energy. Next, we'll see how the inherent energy of an emotion may also be used to generate activities that resolve more complex needs. We'll see, how we may be able to develop a range of activities that not only exercises the system, but contributes to a balanced pattern of interesting, vibrant, pleasurable, and emotionally healthy experiences.

In Chapter 7, then, we'll see how feelings reflect gathered energy, which can be spring-loaded to generate activities that maintain good circulation.

Notes

Part 3

Cycling: Conscious Instants in Patterns

Chapter 7

Generating an Activity

We've learned how each kind of conscious instant in the conscious stream is formed by activity in certain links of the circuitry–for example, a link from sensory tissue to the thalamus or from the cortex to the thalamus.

A harder problem for me to solve was finding a physical basis that explained how I could have a thought of something that I needed or wanted to do (a projected resolution) and then follow through to do that thing. How did I get it done? For example, if I needed to go to the store, how did I get there without being focused on it all the time?

I had a few clues: I knew the process started with a goal–a projected resolution of what was wanted–and I understood achieving that goal takes a series of steps or a pattern of cycles. In other words, a trajectory initiated when I derive a goal cycles around links in the nervous system until what I project becomes a current state.

After I began following trajectories through a series of cycles, I started considering the character of circulation in the nervous system circuitry.

When getting a resolution takes time

Why generate an activity? Sometimes it takes time (a chronological series of steps) to arrive at a resolution, and we need to maintain propulsion during that entire series. Now, let's see how a cycling trajectory takes us from a need to relief. A pattern of cycles starting with a feeling–*a need*–and ending in a resolution that releases that feeling is called an activity.

The need can be either intense physiological or intense reflective stress. An activity uses this initial stress to energize, but it continues to be driven by absorbed and converged energy as the steps proceed. An activity, then, is a pattern of cycling trajectories in the circuitry that leaves a series of sensations, recordings, thoughts, and feelings in the conscious stream.

This pattern is a complete experience. It brings us from an unfulfilled need to a sense of contentment that is generally either relaxing or invigorating.

And when completed, this pattern often leaves an activation pattern set that propels the next activity. In this way, activity after activity, circulation is maintained as we go through a lifetime–the longest encompassing activity.

Because it's more involved, this cycling process may be harder to envision. Here are the steps:

1) An activity begins when we experience a conscious stagnancy. The conscious need of current reflective or physiological stress is the gathered stress that jump-starts an activity. It provides sustained activity for the continued absorption and convergence of energy we need en route to the resolution of relief.

2) As activation patterns of current conditions converge, they highlight a previously recorded temporal trail (the earlier recorded steps from a stagnant state to its relief) with similar initial qualities or conditions. For example, consider when we went to the refrigerator and got something cold. Afterward, this trail has been highlighted

(activation patterns are energized), which gives us the steps to get something else cold.

3) At the end of the highlighted trail, the derived pattern is a thought. In other words, the terms of the resolution for the activation pattern are derived as a projected thought .

4) Reflective stress of the resolving thought follows.

5) The current set of activation patterns (including the new projected resolution and its reflective stress) derives the next step: a thought. (Remember that a thought is also the first step we must achieve to make progress.)

6) The current sensory absorption of what is available (activation patterns) brings in the specific detail, fulfilling the projection, bringing it into being.

7) This new achievement (activation pattern) is added to the highlighted trail, causing the next step to be derived. That next step is the thought of what is needed next (series of derivation patterns along the trail).

8) As we cycle through the steps of projection and selective absorption, we build the bridge in the cortical network, tracing the highlighted temporal trail to a resolution.

9) At times along the trail, to maintain circulation, we pivot. We adjust the way toward resolution or initiate a new tangent so that we can stay on track to an eventual resolution (as often happens with unexpected or unavailable resources or information).

10) The final resolution sinks into the network, achieving orientation and a new activation pattern.

11) Feelings of relief follow and reflect the stress released.

12) A new need emerges, and the next activity in the series begins.

Stress sets cycles in motion

Now we'll walk through the process that we call an activity as it takes us from a conscious distress to its relief.

As we trace the stages of the activity, we'll follow activity as it cycles around the nervous system. In fact, we'll define a base pattern of cycles.

We'll use the inherent energy of the initial stress, whether reflective or physiological, to initiate the activity. Then we'll sustain the activity as cycling continues by using energy absorbed from the environment and energy accumulated as activity converges in the circuitry.

As we generate an activity, the series of cycles in the nervous system will leave a corresponding pattern of sensations, thoughts, recordings, and feelings in the conscious stream. For example, *en route*, cycling will cause ever-changing reflective stresses that leave waves of massage-like stress and release feelings, as well as muscle movement feelings. To demonstrate the activity process, we'll trace an activity that begins with the physiological distress signal of being hungry. We'll look at the steps to its resolution and the following feeling of relief.

Let's start with the steps outlined above:

- We experience a conscious stagnant. The conscious need of current reflective or physiological stress is the gathered stress that jump-starts an activity. This need provides sustained activity for continuation of absorbed and converged energy to reach a resolution.

An activity starts with the feeling of stagnation–a signal that relief is needed. As you may recall, a stagnating feeling is a conscious signal of gathered energy that reflects a need for energy to move on into a resolution. The resolution provides fresh reflective stress or allows us to focus on fresh absorptions of energy from the environment.

If the need isn't resolved, and preceding energy is maintained, either reflective or physiological stress continues to gather or build. Through this stress, the receptive tissue is further stimulated or depleted, increasing the stagnant experience, such as in increased hunger. So, as stagnation progresses, stress may enter the conscious stream in degrees of hunger.

In this way, steady or repeated stress reinforces the signal. Usually this stress is experienced as mild discomfort–just enough to be noticed. The attention attracted by the slight discomfort further indicates the need to find relief or to stop energy from overstimulating the tissue that is sending the signal.

The gathering stress creates a conscious reference-a need to keep energy minimized by either eliminating the source or by redirecting the energy. Redirecting the energy of a projected resolution, for example, takes the reflective stress off muscle.

Temporal record derived and charts course to resolution

- As activation patterns converge, they highlight on a previously recorded temporal trail (the recorded steps from one state to another) that has similar initial qualities. For example, this morning I went to the refrigerator and got out something cold to drink. After lunch the highlighted trail supplies the steps to get something else cold when I want another cold drink.

At this stage, when thoughts, sensations, and feelings, including the physiological and reflective stresses from an activation pattern set in the network, converge in the network on the single pattern, that pattern is often a temporal pattern defining a series of steps that leads to a resolution. In other words, the activation patterns converge through a temporal pattern–a trail of records already fused in the network.

The pattern at the end of the trail is a projected resolution. This trail takes time to be followed–so it takes time for the projected resolution to be achieved. The trail of the temporal record defines a previous series of steps that starts with core qualities similar to a previously successful temporal trail. And, the trail of temporal records comes to a similar resolution. A current distress will use these records of an earlier resolution (the path of least resistance) to "find its way" to a projected resolution.

For example, whether we're watching a bee harvest pollen, listening to a conversation, reading a newspaper article, or following a medical procedure, we are recording a trail of steps.

The intensity of the energy in the propelling trajectory stays backed up along this trail of temporal records to the projected resolution. In the case of hunger, the projected resolution is a satiated stomach. The entire linkage of temporal records from the initial stagnant state to the series of activity patterns that provides relief state is "highlighted" in the cortical network.

For as long as energy from the original stress keeps pushing through this highlighted trail, its records and the adjacent network remain energized.

Because of its energization, the trail of records acts like an on-call guidance system. It serves as a steady activation pattern set that affects each succeeding derivation. Envision the trail of records as a highlighted trail carved out in the network.

In summary, to achieve the resolution we need–dinner on the table, say–the highlighted part of the network stays active to guide each step, or cycle, in turn.

Projected resolution identifies core qualities

- Terms of the activation pattern resolution are derived as a projected thought

Through the resolving temporal record, the current activation pattern set derives a projected resolution made up of core qualities of the resolution (and other specific qualities).

In the case of hunger, the projected resolution is a thought of what will release the particular psychological stress of wanting food.

The specific projected resolution may be vegetable soup, the image we derived as meeting our need to relieve our hunger. We need the thought to achieve the reality, and so we project it and it becomes an activation pattern.

When the resolving thought is food, steps to resolve the stress may include looking for something available to eat, warming it up, and then eating it before the physiological stress will be released. As seen in this example, a series of steps needs to be completed before the hunger–the original distress–is relieved.

Now we'll follow a trajectory and see how each cycle, from the highlighted trail in the cortex and back, is a mini-resolution. And we'll see how the highlighted trail acts like a bridge by bringing the projected resolution closer and closer to realization with each cycle.

Reflective stress follows resolved thought

The reflective stress of the projected resolution–the thought–puts a feeling of need into the conscious stream. When the feelings is greater or more intense, it is driven by intense stress. We *need* relief. Your body is oriented in a direction to get vegetable soup.

The reflective stress remains and doesn't move because it hasn't been fulfilled. Merely being oriented toward relief does not provide the course of action that will eliminate the stress. In the case of hunger, the longer the stress remains without relief, the more energy will be sent from the physiologically stressed stomach tissue. This energy gathers on the reflective stress of the projected resolution. Compounding stress

increases a sense of irritation or need–that signals with even greater intensity that something needs to be done.

While gathering stress is increasing the signal, the hunger, and its reflective stress, is also accumulating or stockpiling energy that may help push the set of cycles along until resolution is found. In this way, the originating stress is a wellspring of energy that propels an activity.

Defining the new step to the resolution

After determining the projected resolution, or what would resolve the need, the next step of the activity is to fill in the details of core qualities for what would resolve the need.

These details make the projected resolution a reality that can relieve the original distress. And after the projected resolution pattern is sent to the thalamus as a thought, the thought derives a reflective stress. Because this reflective stress reinforces the projected resolution, pressure is maintained in the network.

Pressure follows the highlighted trail, retracing it to the end where the projected resolution occurs. In other words, both the projected resolution and its reflective stress, as pressure, come back into the network and reinforce (providing activation of) the highlighted trail.

Where do the trajectories of the projected resolution and its reflective stress converge? The resolution converges on the pattern–a point on the bridge we are building. That point is the present–it's between the past of the activity we've achieved and the final, future projected resolution.

So at the start of the activity, the initial convergence of patterns on the trail occurs somewhere near the beginning. In this way, the projected resolution helps feed back energy to maintain energy on the trail.

A new thought of what is needed next is derived to the thalamus. The new thought is followed by its reflective stress.

Gathering energy: to propel and build, step by step

- With the reflective stress, the current sensory absorption is reinforced by what is available. This absorption brings in the specific detail, to fulfill the projection. The fulfilling is required to bring it into being.

The communicated reflective stress pulls in real detail from the environment. This new detail is brought into the network. The detail fills in the core qualities and becomes "what is," what we have achieved to this point.

This new experience, then, is followed by its reflective stress. The new reflective stress again starts the sensation absorption process that comes when the reflective stress of a thought overlaps with that of current sensation (to bring in specific sensation information).

This process of sensation absorption recurs many times (with each step) in an activity. Remember that in this process, the reflective stress of the thought expresses a pattern on muscle tissue. And the reflective stress of incoming sensation expresses a similar pattern on the same muscle tissue. Together the reflective stresses superimpose; they are a match. When the sensation superimposes the thought of resources we need, those resources are now available to use. They are a reality.

So when superimposition occurs and the details of the thought are filled in, the projected thought becomes real, completing that cycle. In this way, current sensation resources that are needed are identified and used to drive the activity forward. The use of successive reflective stresses drives the projected resolution closer to reality. And, of course, new sensation contributes more energy into the activity–to keep the cycling going.

Let's look again at our example. If you have the thought "I need a pot to heat up the vegetable soup," the reflective stress of the pot will bring any pots that you see in your immediate environment into focus.

This focus happens because an incoming sensation gives you a reflective stress that is the same as a thought of a potential resolution. The resulting superimposed stress is a sensation that becomes a focus in the conscious stream. The focused sensation galvanizes our muscle and automatically draws our attention to the appropriate pot. Remember, an activity is an energy-driven process: Energy is both absorbed and is recharged as energy in trajectories converges. When we see a potential resolution, because light waves bring in the energy, our eyes recognize the pot.

This incoming energy then propels the activity forward and keeps this activity going. In this way, resources we need to maintain this activity are pulled in so that we have something to put soup in and can advance on to the next step of heating up the soup to relieve hunger.

Achieving the next step

- With this new activation pattern (to a new activation pattern set, which continues to include the highlighted trail), the next step is derived. The next step is the thought of the next step needed.

When the next step is achieved, it's a new activation pattern that overlaps on the successive step of the energized trail because that's where the current combination of activation patterns converges on the trail. The point of convergence is the common ground of transitioning steps.

In other words, the next step of the energized trail is where energy from all sources flow together. Now that we have something more, but not what we need altogether, the converging energy continues to the next state that has to be filled in along the trail. The next state also is the next step that becomes a plank in the bridge to the end of the activity.

That next step (state) is another thought. In this way, the next step often is the derived thought of what happened sequentially in the past–when the core qualities were the same as those in the current situation.

What's next? What do we need next? A bowl for the soup? A spoon? Crackers to crumble in the soup? We are obtaining the resolution of the combination of activation patterns we just brought into being. The new resolution is now a current activation pattern in the network. The new resolution also is a factor in the character of the next resolution.

Each resolution helps elicit the specific terms of the next step and resolution. And on and on.

Building a bridge to a resolution

- We build the bridge in the cortical network, along the highlighted temporal trail, to a resolution.

Note that in this process of next steps, when each resolution is achieved, the next step automatically follows, depending on the current conditions. This cycling continues almost on autopilot until we get the final resolution that relieves the initial stress and its reflective stress. As we consume our hot soup, for example, the tissue is satisfied and the need fades.

We've seen in developing the model how an activity is a united process. The activity is a set of cycles in which we maintain a trajectory that gets us from a form of distress to relief. All the while, we can see the concepts of energy absorption, convergence, and divergence being used over and over.

And on the corresponding conscious level, we experience an activity as a series of steps in which we work from a sense of need to a state of emotional relaxation or satisfaction. But each activity often varies from the original, adjusting the projected resolution.

Adjusting activity *en route*

- At times along the trail, we pivot. We adjust the way to the resolution or initiate a new loop-like tangent to stay on track to an eventual resolution.

In an ongoing activity, we have a current highlighted trail to guide us, but we often make adjustments. If for an

unforeseen reason, we don't get the resource trajectory (trajectories) we need to continue the activity from the environment, the activity may stop or we may have to add more cycles to keep the activity going.

For example, we may have to walk to another cabinet to get a pot or we may have to chop wood to start a fire to warm the food. In any case, with each cycle and its achievement, we add a new piece to the bridge we are building through cycle after cycle.

Sometimes in forming the final projected resolution, we add extra cycles or we take a different trail as a more precise resolution is defined or as current terms change (such as the weather). These adjusted cycles bring us closer to getting the soup that satisfies our longing.

Settling the resolution in the network

- When we get the final resolution, it sinks into the network, achieving orientation and a new activation pattern.

When an activity is completed, the resolution or outcome enters the network and builds a final record of the terms of the relief. The projected resolution now is an actual resolution and because it now exists (rather than is projected), it sinks into the network as "what is." The resolution is a part of the current activation pattern set that may help suggest or determine what the next activity will be.

When the combination of qualities in the resolution that remains after an activity gives a sense of "settling in" or "sinking in," this sense is verifying that the conclusion of the activity is being absorbed and accepted into our network.

This acceptance can be for a new piece of information built into the network or for a new resource. A new definition or resource that fit well into the network has the effect that the outcome of the activity "rings true." And when this acceptance sinks in deeply, as noted in the discussion of activation orientation in Chapter 4, the active orientation

causes a sense of recognition of something familiar, present, and accepted.

Of course, as an activation pattern, this final resolution may affect the character of the next activity.

The feelings of relief follow

- Feelings of relief follow and reflect the stress released.

With the final resolution, there is no longer a need-level reflective stress. This ongoing stress is released, and we experience a sense of relief. Following the sense of release, the reflective stress of the new projected resolution takes its place–almost like the next step of a body massage. So both the release and the new reflective stress can be significant components of our invigoration-relaxation pattern. These stresses and releases criss-cross on the body to provide overall feelings of balance.

The relief and the new reflective stress pattern cause our muscle to feel taut, focused, and strong. And in experiencing balanced activities of relaxation and invigoration in massage-like patterns, we gain a sense of well-being and confidence.

A well-fitted outcome can also provide other significant feelings of relief or satisfaction, such as a sense of something being settled and a solid sense of orientation. In gaining these resolutions, then, we achieve feelings of security, strength, and competence as well as positive expectations for the future.

Because we feel at ease, this relief leaves an opening for fresh bodily or environmental absorption. A calm but strong background helps us be ready or oriented–almost without bias.

In other words, a state of secure feeling can help us focus on and provide a backdrop for more detailed orientation of something (in fact, more content) in our body or our surroundings to be absorbed. We may well, for example, adjust to conditions in the body that were on hold as we were unfolding an activity. After we eat the soup, we

may have the energy and optimism to take on a postponed task, for example.

The strength or degree of relief varies. If the resolution of the activity is less than complete, the end feeling is a kind of unresolved stagnancy. We may feel a dichotomy. For example, our thirst wasn't fully quenched or we didn't hear a person's full name when we asked for it. If a preceding reflective or physiological stress is released with the new outcome and it's a dramatic release, we may feel a strong, deep sense of emotional relief. The emotional strength of feelings after an activity depends on the preceding energy that moved.

An emotion remains to contribute to the current activation pattern set. Like any state, if it is constant, the emotion becomes more dominant and "catches our attention." Whatever the final feelings, the current feeling (and its contained energy) is a new combination of activation patterns that opens the door to the next activity.

Activities continue in series

- Another need emerges, and activities occur in series.

After a resolution is achieved, and has provided its resources, the resolution settles in the network as an activation pattern and the next dominant need emerges in the conscious stream. During our life, in fact, emerging needs cause us to focus on one activity after another.

When an activity is completed, the resulting conscious state is now a part of the next combination activation pattern in the network. In fact, an activity often leaves something that is used, even needed, to unfold the next activity in the current time frame. In this way, the ending state contributes to the active network combination and sets up for the next activity to begin.

To review, at the end of an activity, we have a resolution containing energy. As this energy penetrates the network, it

joins with other current activation patterns (which in turn, contribute their current energy). The patterns converge to resolve the current combination. The character of the network is important, because when we have resources that are accurately defined, we can draw in resources efficiently and respond in terms that complement the integrity of the subject. At best, as the next activity unfolds, it draws in resources and yields resources in terms of the integrity of the subject at hand.

Whatever the ending resolution is, its driving energy either penetrates the circuitry or is released through muscle. When the driving energy of the ending resolution penetrates the network, the resolution energy often derives a pattern that it remains a part of. The new pattern in turn may spring-load and initiate another activity.

By its nature of being an achievement, the conclusion of an activity–a trajectory–is nested into the network context, which is often a place in a larger temporal pattern.

The image of the pattern that the achievement is nested into can be derived so that we get a quick impression of the entire image or pattern. This impression is a time frame (an ongoing physiology pattern, schedule or an image of the body's invigoration-relaxation "massage" pattern, for example) of what we just contributed to and derives the next activity. The next activity derived brings us the next stage of the pattern that the current state is part of.

For example, the next stage could be a part of the current physiological pattern that needs the next stage to get fulfilled or it could be the current time frame, which derives the next activity.

In coordinating our activities to meet a variety of needs, we often plan by using a time frame. We commonly refer to images of time, such as the hours of a day, a weekend, a season of the year, a particular holiday, or a lifetime. The time provides a space for a temporal activity. It is a form of orientation, a pattern containing a distinct set of changing core con-

ditions, like signposts, during a length of time. We know where we are in the time frame by emerging physiological signals, such as becoming tired and ready for sleep.

As the time frame progresses, different activities are needed to resolve each situation, providing, in turn, either resources of relief or invigoration. Our conscious stream frequently inserts activities into an ongoing pattern to resolve the stagnant stresses that come up, and then to reorient ourselves to the current time frame.

The unfolding of a series of activities is much like a single activity unfolding; that is, when an activity is done it triggers the next one in the highlighted trail it is part of. The following component in a series is the next logical or sequential image in a time frame–the spatial image that comes to mind when we recognize our orientation in time.

As with an unfolding activity, not all the plans we lay down follow as we expect. As with the unfolding of a single activity, when a plan unfolds, we get information coming in that is expected or planned as well as unexpected information. So plans change in transit to deal with new emotional states as they arise.

We add or subtract activities and we learn or develop new ones. Often, however, as with an activity, what was expected isn't available, and what wasn't expected is present. To accommodate a pattern, we may rearrange the activities making up the pattern. As the day's activities are set in motion, activities are frequently added or abandoned altogether to maintain propulsion. If the weather prohibits us from planting a garden, we may sharpen a hoe instead.

Toward developing a healthy lifestyle

In the next and last chapter, we'll see how a pattern of activities forms a lifestyle. And we'll see how each of us develops an individual style of physiological, social, and environmentally involved activities. At the same time, at best, we feel a complementary muscle tension pattern–one that

forms a balanced pattern of invigoration and relaxation–an equilibrium like that of any other physiological activity.

Specifically, we overlay physiological, social, and individual activity patterns generate a personal lifestyle. In this chapter, we'll find that when activities work well together, we maintain a rich level of circulation with a relatively low level of stagnancy–keeping the nervous system exercising and functioning at its best. An optimal functioning of the nervous system contributes to the body's well-being.

In completing this model, then, we'll see how our personal circulation can be tuned up and maintained. The ability to tune up and maintain a resilient and emotionally fit personal circulation is important because circulation supports

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and complements the integrity of our physiology, our extended family, our society, and our environment.

Chapter 8

Lifestyle: A Personal Pattern of Activities

Now we'll see how, during our lifetime, we develop a routine pattern of activities–a lifestyle. We'll continue to use this model to see how our unique lifestyle develops and how we maintain healthy circulation in the nervous system, a circulation character which we know as emotional well-being.

Each of us develops a unique, evolving, personal way of life–a pattern of routine activities that begins in infancy and slowly shapes our life. We may alter that pattern at each new stage of life begins. Patterns of recreation may change, for example, as we learn, marry, have children, retire, or become less agile.

The activity base for any lifestyle is a hierarchy of life-supporting physiological activities. Within these physiological patterns, we build in activities that have conscious components, allowing us access to consciously recorded to resolutions.

Physiological activity patterns define our lifestyle from infancy

As infants, even before we're conscious, a vast set of integrated, synchronized activities is already set in motion. Thousands of reflex-like activities are constantly working together for us. A hierarchy of physiological activities, such as those that maintain internal temperatures and the oxygen content of blood, keep us thriving.

Although many physiological needs reflexively generate activities, others, such as energy in the conscious pathways, require our attention to access our developed network and drive resolutions. For example, when we're tired or hungry, we're aware of the physiological stress. Being conscious of our physiological condition allows access to the network for a resolution. If we are tired, we may identify a time or place to sleep. If we are hungry, we may find a source of food to eat.

A reflex is a mini-activity in the nervous system circuitry. As we experience a reflex, we record the incremental changes in muscle positions that occur along with their corresponding muscle sensations (conscious counterparts) we experience.

When we record the series of positions and corresponding tones that result, we record incremental muscle movement, and we record the steps of a reflex that took the most direct route from the stress felt at the beginning, to the relief at the end.

In other words, we record the steps from the stagnant stress (at a muscle increment) to its relief. So our body, through recordings in the network, learns that to get to a certain state or position– a relief sensation–it must enact a series of movements that begin from its current state or position. In this way, when we derive a projected resolution with a certain muscle sensation, muscles move to that place where a sense of relief is experienced.

From infancy, the stresses we feel start pushing energy into the circuitry through circuits available, often reflexes, to resolve stress. As we mature, the sensory circuits begin to feed

the conscious stream and corresponding records are made between conscious experience and reflexive stages.

In early life we record many trails that take us from stress to relief. When, as infants, we reflexively expressed the stress of hunger by crying, for example, we recorded the source of the relief, the movements we used to gain it. If we were nursing, we recorded the act of reaching, sensations of touch, and the smell of milk, all of which formed the signposts along the way from hunger to satisfaction.

About the same time, we may have learned that crying could bring rocking, or a dry diaper. Other examples of simple reflexes with conscious counterparts are rubbing itches, adjusting for unbalanced body positions, and crying (unleashing stress) when a finger is pinched in a drawer. At times, too, we often move to orienting positions that allow us to absorb certain sensation from the body or environment.

In each case, a mini-activity unfolds and forms a temporal record—a series of steps or sensations—that take us from stress to relief.

Records of reflexes become building blocks for achieving more complex resolutions. We connect these blocks together in standardized orders to make thorough responses, and even routine lifestyle activities. In fact, we often dovetail mini-movements to form longer records that we can use to derive more precise resolutions.

Or when conditions change, we can change, integrate, and rebuild the way to a resolution as we derive the most direct arrangement of "building blocks." For example, we may change direction or pivot to maintain focus or control or to access particular resources to get a resolution.

Activities making up our lifestyle can be divided into those that invigorate and those that relax participating muscle in route. A pattern of activities in which invigorating and relaxing feelings balance well supports healthy circulation. Too much invigoration is excessive stress, and too much relaxation leads to stagnant feelings, such as being unappreciated, lost or bored.

Many cyclic physiological activities are dominant enough to help organize our conscious life. For example, our sleep cycle defines the spaces of the day in which other activities are set and unfold. Our lifestyle activity patterns, defined by physiological timing, are often rhythmic or periodic, such as our need for food and water; progressive, such as in muscle development and the coordination with growth; or intermittent, such as the physiological responses to injury.

Fulfilling the physiological activity patterns is the backbone of a healthy life. An adequate supply of physiological resources allows us to develop the physical strength and stamina that help maintain the propulsion of circulation. Without life-supportive resources, such as food, air, and rest, the conscious signal of unresolved physiological needs can be strong and unrelenting.

When unresolved need continues, the level of stress increases and enters and dominates the conscious stream. The accumulating stress enters, and accesses the network as energy to drive a resolution with other activation patterns present.

When a stagnant stress is unrelenting and begins to dominate the conscious stream, the debilitating trajectories entering the network act to stagnate the activation pattern set. This stagnation prevents a resolution from being derived and keeps other activities from providing other needed resolutions.

At best, incorporating and maintaining a routine balance of activities at any stage of life increases feelings of confidence, clarity, strength, and resiliency.

Developing a personal style

Social interfaces have a strong impact because, from the start of life, the social context we are born into affects the kinds of subjects and activities we record on our physiological base.

For example, activity patterns begun in childhood often remain vivid. They are the first network outings on which our

later "schedules" are modified. This description of a kindergarten morning shows an early activity pattern I was introduced to:

In the dark Denver mornings, I was one of the tired kids who lumbered through an unwieldy door and walked along the edge of a large room to a smaller cloakroom. Each child took off a hat, mittens, and coat and put them on hooks almost out of reach. We set our lunches aside and often moved on either to satisfy our thirst or get to the bathroom.

We then gathered to finger-paint on a long sheet of white paper on the floor. After applying the finishing touches, we cleaned up and washed our hands, sometimes smudging our clothes in an effort to clean one little spot. We formed a line for a ride down the slide, followed by a lower energy job of sitting down elbow-to-elbow on the floor to listen to a story or perhaps learn a song.

Sometimes in front of many others, we answered questions, forced or voluntarily. And sometimes we gathered in front of a piano to learn the words and the up and down sounds of a song. Then a little bit clumsily, we put on our coats and went back out into the brighter weather, and gathered in bunches. We came back hungry for lunch. We ate orange slices and macaroni and cheese with milk, which brought our activity pattern to the top of the morning–full of exposures to physiological, social, and environmental resources–generating a range of newly introduced activities on a physiological base.

At best, social interfaces complement and propel activities that fit into making up our balanced lifestyle. Consider the impact of shared meal preparation, exploring a new subject, sharing thoughts with our peers, developing information on the finer characteristics of an old subject, or making repairs.

In teams, we can efficiently develop resources as well as contribute to our balanced lifestyle pattern.

Tuning up circulation: integrating integrity

If this book presents an accurate model of how we work, we can use it to relate feelings to events that may be happening in us and actively seek out activities that will provide balance. Activities that provide balance will direct our energy into activities that maintain circulation.

For example, although we may garden to support our love of flowers and the relaxation the activity provides, adding a gardening activity also allows us to enhance our invigorating and relaxing activity pattern by fulfilling the body's need for exercise.

Another benefit–as, or more valuable than enhancing our activity patterns–is the ability to avoid problems–when we have an accurate model of how we work well. Our model of how we work becomes an internal point of reference to keep us from straying too far from what we know supports good circulation. When we lack an accurate internal reference for resolutions, we depend on the networking of past experiences, whether or not they are complete or accurate definitions.

An insight into how we work may also help us to see that, in some conditions, it may be better to promote dissipation of stress through expression in a way that is not harmful. Or, when we don't have an activity in mind or resources to resolve a particular stress, we can dissipate stress in other ways.

To release the stress, we may break up those dirt clods, pull those weeds, jog, shadow box, swim laps, pound a pillow, chop wood, shout, cry, withdraw, or displace the stress into another subject. In any case, the accumulated energy of stress must be used.

Knowing how the nervous system works also provides clues that we can recognize as forms of emotional distress. This recognition enables us to change circulation at the first sign it is deteriorating.

These clues are similar to symptoms for any other health-related condition, such as the signals that blood sugar is too low. In terms of good circulation, when healthy, thorough definitions have been recorded and are energized, we can select the good or most beneficial resolution.

We can also apply our knowledge about circulation to generate "desirable" problems and challenges that exercise and bring satisfaction.

In other words, by knowing how the system works, we can choose among present trajectories and generate an activity that provides a touch of welcome balance.

In everyday terms, we generate activities not only to avoid or eliminate distress but also to provide challenging, productive and comforting activities. With insight, we may be able to use the energy of any stagnant stress to generate an activity that either invigorates or relaxes. Insight may keep us from harmful activities like substance abuse or grumpy stagnation.

Complementing environmental and social integrity

How then does personal emotional fitness support the integrity of society and the environment?

Just as in knowing how the nervous system works to maintain emotional fitness, knowing how the environment and society work well helps directs us into practicing activities that retain the integrity of and perhaps reclaim or enhance the environment and society. At best, we can use activities that provide resources to maintain our balanced invigoration and relaxation pattern.

Our invigoration-relaxation pattern can also be richly nourished as we develop an understanding about our natural and man-made environment. When we know how a car functions, a new noise becomes a clue that helps us to identify and repair a potential problem at an early stage, before the damage expands and the condition becomes more difficult to fix. Knowledge of how the nervous system works provides similar advantages for early identification and repair of potential problems.

Knowing how a car functions also help us understand how the use of lubricants and fuel keep the vehicle tuned up and working well in the first place.

A complementary lifestyle includes maintaining the integrity of environmental resources we have. Our ability to maintain our resource integrity depends on learning the natural workings and relationships of our immediate and distant environments.

To maintain integrity, we can follow the trail of the resources we consume back to the source and factor in future use to determine its efficient handling and preservation. In this way, as we dedicate ourselves to understanding the character of the environment, either natural or developed, we tend to work within its parameters of well-being.

At the same time, as resources are used to propel a healthy lifestyle, they can drive activities that contribute to an environment that supports and rewards health throughout society.

Sharing activities and resources with one another also allows us, as we update our network, to develop and use our personal resources where they may be requested. In fact, when we are involved with others in a complementary activity, such as a conversation, the steady back-and-forth expression with the absorption of sensation, and its following reflective stresses, may propel circulation.

Complementary circulation, in fact, may help us feel a oneness–a sense of belonging, peace, and love. Sometimes, in fact, just passively relishing the presence of another may be a relaxing activity that is nurturing. Cuddling a child or a spouse can give all involved a sense of contentment. Being alone and quiet with another may be a preferable way of bringing a refreshing calmness into our conscious stream.

A good first step to reduce the potential for inadvertently causing stagnancy in others is to practice balanced emotional well-being ourselves. When we know how emotions of anger and frustration evolve in various conditions, we can help prevent those emotions from escalating. We may redirect the mounting energy into an activity that provides a needed piece

of balance–say a form of relaxation–while eliminating an adverse social effect.

Knowing how we as individuals work well can be a guide to harmony within society because the conditions that support circulation are very similar from one person to another. When we keep ourselves emotionally fit, we contribute to the emotional well-being of those with whom

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we interface, and help form and maintain a healthy society–for all of us.

Afterward

Thank you very much for coming on this journey with me to explore how the nervous system makes consciousness. I'm pleased you've allowed me to share these ideas with you.

Looking back to when I was eleven, I somehow knew I could work "better" and simply wanted to know how I could learn to be the best I could. I didn't know I would need to take this route to find my answers. But in the process of developing these concepts, I've found an increased sense of security. I hope that may also be true for you.

From here on, I hope you can personalize and improve upon anything you've found to be accurate and helpful in this

model–as we continue our quest to learn about ourselves and help each other as we become the healthiest--both physically and emotionally–we all can be.

Part 4

Appendix

Recommended Reading

The following books contain valuable facts, and ideas on models that can be compared to the conscious stream model described in this book.

Alkon, Daniel L. , *Memory's Voice: Deciphering the Mind-Brain Code.*

Allport, Susan, *Explorers of the Black Box: The Search for the Cellular Basis of Memory.*

Braun, Stephen, *The Science of Happiness.*

Calvin, William H. , *The Cerebral Symphony: Seashore Reflections of the Structure of Consciousness.*

Churchland, Paul, *The Engine of Reason, the Seat of the Soul.*

Crick, Francis, *The Astonishing Hypothesis: The Scientific Search for the Soul.*

Damasio, Antonio, *The Feeling of What Happens.*

Edelman, Gerald and Givlio Tononi, *A Universe of Consciousness: How Matter Became Imagination.*

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About the Author

When I went to college, no learning track on how the nervous system makes consciousness was offered, so I began an independent study that would help me relate the two–the nervous system and consciousness. I thought it would take me a year or so to get this definition ... but it's taken over thirty.

I felt the way neuroscience was studied, at the time I went to college, wasn't a direct way of getting a nervous system–consciousness relationship. The approach missed the "forest for the trees" by not bringing some of the finer details of the conscious stream into how consciousness was "looked at"–to be resolved with the physical characteristics of the system. In other words without the (more) precise conscious detail, I didn't think consciousness could be accurately related to the nervous system, the part of the body it was commonly associated with.

This study's dependence on conscious detail, then, and the delicate nature of postulating ever-changing ideas, made it a something I could do (actually, had to do) by myself.

Over the years I've worked independently, and compartmentalized my time on this subject, especially when communicating. I use my pen name–Anne Olson–when I have time to make a contact that might help the study. I often can't

talk or write about this subject as much as (or when) some people would like, but I typically review short e-mail messages I receive, via my pen name, and again just respond if I think it might help the study.

Now that I've written out the model as well as I can, and with as much detail as I can, it's time for a *reality check*–through this Review Edition. Can a conscious instant, for example, be recorded when "sparks" of a trajectory separate and rejoin? The Internet is where I answer questions and respond to correspondence (as described above).

Soon after this *Review Edition* is published, and responses are reviewed, I will begin working on the *First Edition*.

You are welcome to visit the Internet home page for this model at: www.cstream.org (or http://community.gorge.net/neuro). As it's developed, this site will contain the complete text of this book, links to related sites, and more.

Notes

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