

The Wise Brain Bulletin

News and Tools for Happiness, Love, Effectiveness, and Wisdom

Relaxed and Contented (Part Two): Activating the Parasympathetic Wing of your Nervous System

Rick Hanson, PhD

Introduction

In the previous Wise Brain Bulletin (#5, at <http://www.wisebrain.org/bulletin.html>), we began exploring the portion of your nervous system that helps you feel peaceful and alright. It's formal title is: "the parasympathetic wing of the autonomic nervous system" or PNS, for short.

What's great is that you can trigger the PNS at will, which immediately lowers your sense of stress, brings health benefits like reducing blood pressure and strengthening the immune system, and lifts your mood. This gives you more control over your inner landscape – a nice thing at times when the outer world seems driven by forces that are beyond your influence, from local traffic jams to global warming.

In the previous Part One, we covered:

- The structure of your nervous system
- How stressful events (e.g., multi-tasking, job reviews, arguments, feeling upset, medical worries, letters from the IRS) set off the "fight or flight" sympathetic nervous system (SNS)

- The incredible ripple effects of the SNS throughout your nervous and hormonal systems – all within a few seconds, and all designed to help you survive and have grandchildren

Here, in Part Two, you'll learn about:

- The long-term results (not good) of chronic SNS activation, including the emotional effects of painful or even traumatic experiences
- A simple but comprehensive strategy for dampening the sympathetic nervous system and fueling the "rest and digest" PNS
- The reasons why your fundamental nature is actually rooted in the core qualities of the parasympathetic nervous system: peaceful, present, satisfied, and quietly happy.

Descriptions of many effective ways for lighting up your parasympathetic nervous system are interspersed throughout Parts One and Two. For example, the everyday techniques

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Greetings

The Bulletin offers skillful means from brain science and contemplative practice – helping you to work with your brain for the benefit of yourself and others.

The Bulletin is offered freely, and you are welcome to share it with others. Past issues are archived at www.WiseBrain.org.

Rick Hanson, PhD and Rick Mendius, MD edit the Bulletin. We welcome your contributions, and to subscribe, please contact Rick at drh@comcast.net.

described in Part One included: breathing, intentional relaxation, balancing heart rate variability, and mindfulness of the body. And this article will cover the methods of yawning (really!), meditation, increasing positive emotion, and – believe it or not – fiddling your upper lip.

If you really want a clear picture of what is happening inside you every single time you are hassled, pulled in too many directions, irritated, worried, threatened, injured, or upset, then you might

want to read carefully the descriptions of your bodily processes when your SNS flips its switches. On the other hand, that might be more detail than you really want, and if so, you could skim through it and focus on the methods themselves, which are numbered as exercises.

To avoid repetitions of material already covered in Part One, I'm going to assume that you've either read or skimmed that article, or are comfortable just diving into Part Two (which is also fine). For further information, take a look at the slide shows from our workshops (http://www.wisebrain.org/slide_shows.html) or read the Summary of Methods article (<http://www.wisebrain.org/WiseBrainMethods.pdf>).

Long-Term Effects of Chronic SNS Activation

In a nutshell, the SNS shunts resources away from long term projects – like building a strong immune system, or digesting food, or making babies – in favor of short term crises, like getting away from an attacking lion a million years ago. Crises that were usually resolved quickly. One way or another.

But long after the lion has pounced on someone else and left you alone, you're still shaking like a leaf! That's because the effects of the SNS diminish *gradually*, while the effects of the PNS diminish *abruptly*. For example, in a frightening situation (= SNS arousal), it takes your heartbeat awhile to go back to normal even after the danger is over. But when you wake up –

and are no longer so regulated by the PNS – your heartbeat increases briskly.

One reason for this is that, unlike many other hormones, the major SNS hormones – epinephrine (adrenaline), norepinephrine, and catecholamines (which include dopamine) – do not exert any negative feedback to reduce their own synthesis.

Bottom-line, lighting up your SNS is not just a fleeting experience, but something that has a real *stickiness* to it, a lasting impact.

For example, chronic activation of the SNS burdens five major systems of your body: gastrointestinal, immune, cardiovascular, endocrine, and nervous. Let's look at the lingering effects of that wear and tear for each system, with an emphasis on the nervous system, since that's where it feels like we live as conscious beings.

Gastrointestinal

Chronic stress and other sources of SNS activation increase your risk for ulcers, colitis, irritable bowel syndrome, diarrhea, and constipation.

Immune

Routine SNS arousal weakens your body's defenses in numerous ways. This finding is well-documented in numerous studies, and we've all had the personal experience of catching a cold when we're run-down.

Cardiovascular

Hardening of the arteries and heart attacks are all more likely if you experience chronic stress – especially when combined with a steady dose of hostility.

Endocrine

A steady diet of SNS increases risks for Type II diabetes, especially when combined with lots of sugary and refined carbohydrate foods. In the erotic department, it leads to impotence in men and low desire for both sexes.

And it's probably not very good for your longevity, either. The body makes cortisol (one of the stress hormones) and DHEA from the same raw materials. DHEA is sometimes called the "anti-aging hormone" due to its beneficial effects. But under stress, production is shifted toward cortisol, so there's less DHEA.

Nervous

The amygdala. Repeated experiences of fear (and perhaps other negative emotions such as disgust or anger) in-

crease what's called the Long-Term Potentiation (LTP) of neurons in the amygdala; in other words, the synaptic connections there are strengthened. Further, repeated stressful experiences lead amygdala neurons to grow more connections with each other. As a result, in a vicious cycle, repeated experiences of fear and stress make the amygdala more sensitive to and more reactive to fear- and stress-related information.

Now, the amygdala plays a central role in the formation of **implicit memories**: the registration of lived experience (especially the emotional and sensate parts) beneath conscious awareness. When the amygdala has become sensitized and energized in a fearful and negative direction, then it shifts implicit memory that way. Over time, this "dark shading" can lead you to feel a free-floating anxiety, depressed mood, and irritability.

Your implicit memories and negative emotions also create the conceptual lenses through which you see the world. These perspectives seem self-evident – of *course* most relationships are disappointing, of *course* you'll get in hot water if you say what you really feel, etc. – and are thus typically unquestioned, which is what makes them most problematic; like the proverbial fish, we swim in the waters of our belief systems without realizing we're soaked in assumptions.

When you peer at the world through subtly shadowed glasses, it looks more daunting and less friendly, which naturally makes you too cautious or too aggressive . . . sometimes with serious consequences. And in a feedback loop, any "tinted" information coming through your lenses increases the negative sensitization of the amygdala, which in turn darkens your worldview, leading to incoming information that's even more shaded.

The hippocampus. Compared to the amygdala, stress hormones – notably cortisol – have an opposite effect on the hippocampus, a part of the brain that is vital for forming **explicit memories** of events: a clear record of what actually happened. In other words, stress hormones *reduce* long-term potentiation (LTP) in the hippocampus. In the extreme, intense and longstanding stress or trauma can literally shrink the hippocampus.

Further, recent evidence has shown that at least some portions of the brain actually do grow brand-new neurons (contrary to long-held belief), including the olfactory bulb (for smell) . . . and the *hippocampus*. But glucocorticoids due to stress prevent the birth of new neurons in the hippocampus, impairing its ability to produce new memories.

The effects of all this can be quite extreme. For example, in people who have a history of severe depression – which could be regarded as both a result and a cause of stress and painful feelings – the hippocampus can shrink by as much as 10 – 20%. This shrinkage could be one of the reasons for the poor memory associated with depression. Unfortunately, hippocampus atrophy persists after depression resolves; it appears to be a permanent consequence of intensely painful experiences.

The amygdala-hippocampus one-two punch. When the amygdala is over-sensitized and the hippocampus is compromised, it's a horrible combination: painful experiences can get recorded in implicit memory – with all the distortions and turbo-charging of an amygdala on over-drive – without an accurate explicit memory of them! Then it may feel like: "Something happened, I'm not sure what, but I'm really upset."

This could be a reason why victims of trauma sometimes feel dissociated from the actual events surrounding their trauma, yet are very reactive to any trigger that reminds them unconsciously of what once happened.

Depression. Routine activation of the sympathetic nervous system is closely linked to depression, for three kinds of reasons. First, an underlying source of SNS arousal – such as getting fired or needing to care for a demented parent –

Train Your Brain

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The class meets on the 2nd Tuesday of every month, 7 – 9:15 pm, at the Unitarian Universalist church in Terra Linda (San Rafael), at 240 Channing Way. The atmosphere is warm, informal, and focused. The suggested donation for each month of the program is \$40 (and less is gratefully accepted). To register, contact Guisela Luster at drh@comcast.net or simply arrive fifteen minutes early.

Upcoming dates and topics:

- 5/8/07 – Refilling Your Cupboard: Improving your body's molecular balance sheet of assets and liabilities
- 6/12/07 – Concentration: The neurology of stable attention, and how to activate it
- 7/10/07 – Mindful Presence: Accepting change and being with what is; mindfulness in daily life

San Rafael Meditation Group

Open to beginners and experienced practitioners, we meet on Wednesday evenings at the A Sante day spa in downtown San Rafael. Meditation is available from 6:45, with formal instruction at 7:00, ending at 7:30, with a dharma talk and discussion ending at 8:30. It is co-led by Rick Hanson and Manny Mansbach, and for more information, contact Rick at drh@comcast.net.

could also be depressing in its own right; in this case, the two effects, SNS arousal and depression, are associated simply because they share a common cause. Second, the experience of chronic stress has psychological consequences – e.g., no chance to let down, feeling irritable, sense of hopelessness – which can wear down your mood over time.

Third, the physical effects of sympathetic activation undermine the biochemical basis of an even-keeled, let alone cheerful, disposition:

- Glucocorticoids slowly deplete the norepinephrine released throughout your brain by the neurons of the locus ceruleus. Norepinephrine makes you feel alert, attentive, and mentally energetic, so when stores of it run down, you tend to feel a certain dullness, flatness of emotion, weakening of concentration, even apathy – which are hallmark symptoms of depression. (This could be a reason why taking glucocorticoid hormones for arthritis can lead to depression as an unwanted side effect.)
- Stress reduces the amount of serotonin – the neurotransmitter that is relaxing, regulates sleep, and buttresses your mood – in your brain. Additionally, it reduces the number of serotonin receptors in the frontal lobes, so they are less responsive to the dwindling stocks of serotonin that do arrive.

Serotonin also encourages the locus ceruleus (LC) to release norepinephrine. When serotonin levels drop due to stress, that leads to even less norepinephrine from the locus ceruleus, which has already reduced its norepinephrine flows due to increased glucocorticoid stress hormones (which we discussed in the bullet just above).

In short, less serotonin means more tension, worse sleep, more vulnerability to a blue mood, and less alert interest in the world.

- Moderate and brief stresses – in other words, manageable doses – lead to a release of the neurotransmitter, **dopamine**, in the pleasure circuitry of the brain. That's one source of the "high" in some stressful activities like race car driving, difficult skiing, rock climbing, etc.

But – prolonged exposure to glucocorticoids flattens dopamine production. Then, as the classic criterion for depression says, there is a loss of enjoyment in activities once found pleasurable.

Summary

We evolved to handle short bursts of intense stress, and live to tell the tale. But the modern lifestyle of fairly steady levels of moderate stress is completely unnatural, and it has many bad consequences for your physical and mental health. That's perhaps the most fundamental reason for increasing the activation of your parasympathetic nervous system.

Yawning: Exercise #5

So now, as another method for activating the PNS – and one that could be happening on its own as you try to assimilate all the material we just plowed through – try yawning!

Yawning activates the PNS on inhalation and the SNS on exhalation. Taken as a whole, it sure feels like a net PNS intervention.

Strategic Plan

Even though you've just had a fairly nightmarish tour through the potential collateral damage of the sympathetic nervous system, we still need that system, and it's got to work well, whether it's to get through a minor crisis at work or rise to meet the challenge of a late-night call from a teenager who needs a ride home from a party-gone-bad.

Nonetheless, we really do live in a time of SNS gone amok, and we would really benefit from reducing its over-reactions. How to do that?

For sure, it makes sense to deal with your environment. That could mean looking for a job with a less insane commute, parenting a spirited child in ways that help him learn more self-control, or simply fixing the leaky faucet that's driving you crazy at night.

You could also take medications. For example, tranquilizers like the benzodiazepines work by relaxing muscles and by inhibiting the locus ceruleus excitation of the amygdala, reducing its reactivity. Another class of drugs called beta blockers fit into some of the neuronal receptors for epineph-

rine and block its effects – like a bandaid covering a lock so the key can't get in. (Interestingly, beta blockers reduce the formation of memories of upsetting events, and are being explored in the treatment of trauma.)

That said, there are a lot of limits on working with the external world, and lots of benefits in working with the inner world (see the article, Why Inner Skills, at <http://www.wisebrain.org/articles.html>). And there are well-known problems with prescription medications; for example, the benzodiazepines are sedating and addictive.

Therefore, I believe that both research and personal experience tell us that it is the *inner skills* – not environmental fixes or medical treatments – which make the greatest difference to our resilience, well-being, and long-term health.

In terms of bringing a better balance to your autonomic nervous system, you can be skillful inside your own body/mind in three kinds of ways:

- In the moment, dampen the immediate SNS response. For example, focus on moderating factors like social support, the sense of what you can do, and hope for the future. Or distract yourself, or remind yourself not to sweat the small stuff.
- Over the long-term, soothe the SNS reactivity. For example, really emphasize positive emotions in your life and practice taking in the good to help those good experiences register deeply in implicit memory, both of which should reduce amygdala reactivity over time.
- Activate the parasympathetic nervous system. As we've discussed, PNS arousal has inherent benefits, plus it puts a blanket on the SNS. Inner skills for triggering the PNS have been the focus of Parts One and Two of this article.

Further Methods for Parasympathetic Activation

Introduction

By the way, you may have already noticed that many techniques of PNS activation work together. For example, relaxing is itself usually a pleasant experience, thus triggering mildly positive emotions.

To review, we have already covered:

- Breathing
- Relaxation
- Lowering heart rate
- Mindfulness of the Body
- Yawning

Now we'll explore three more methods.

Meditation:

Exercise #6

Meditation activates the PNS for many reasons, including pulling attention away from stressful subjects and activities, sitting quietly, relaxing, and bringing awareness into the body.

An interesting, possible additional reason has to do with a common method of meditation: paying attention to the sensations of the breath around the nostrils and upper lip. In your brain, the olfactory bulb – which receives sensory signals from the nostrils – sends neuronal projections directly to the amygdala, probably due to the evolutionary importance of detecting disgusting, frightening – and sometimes, pleasant – aromas. When you bring your attention to the breath around the nostrils, you activate the sensory networks in that area, including the olfactory system.

As a result, you are flooding the amygdala with information that has a neutral quality to it (that quality is called "feeling" – distinct from emotion – in Buddhism), or a positive quality if you meditate with incense. That would tend to crowd out unpleasant information within the amygdala. It could also sensitize the amygdala increasingly over time to neutral information, leading its processing to be increasingly dedicated to neutral information compared to negative information.

This is not the place to give instructions about meditation, which you've probably been exposed to already. And you can get good information from the books of Christina Feldman, Jack Kornfield, Jon Kabat-Zinn and many others.

From Our Contributors

Skyline

Is the story
You make up

So
Convincing

That your view
Of the skyline

Makes you
Forget

About the
City below

© Tom Bowlin, 2005

Pace

Being on
Your path

Doesn't
Mean

You can't
Pick up the pace

© Tom Bowlin, 2005

Here, I would simply like to encourage you to meditate regularly. Even for just one minute a day. But every day.

And consider joining a regular sitting group in your area. There are an amazing number of meditation groups sprouting up around the country.

Positive Emotion: Exercise #7

Positive feelings activate the PNS directly by lowering cardiovascular reactivity. They also do so indirectly by priming a person to experience life in more optimistic and pleasant ways, and the effects of that include reducing the sensitization of the amygdala to negative events. Anything that gives you a positive feeling – especially of a more relaxed sort, like contentment, gratitude, lovingkindness, or tranquility – will usually arouse your PNS.

Yes, sometimes it is hard to have positive emotions. And that difficulty alone can cause some negative emotion! But just do what you can. There are two great wings to psychological growth and spiritual practice: being with and working your inner and outer worlds. While *being* with is primary, there is still a great role for working with, including the cultivation of positive feelings. (For more on this point, please see the Two Wings article in Bulletin #2, at <http://www.wisebrain.org/bulletin.html>.)

If you like, experiment with cultivating positive emotion for a few moments, and whatever you experience is really fine.

Perhaps focus on what you feel grateful for. Or feelings of lovingkindness, perhaps for yourself or some people you are close to.

And to really reap the rewards of experiencing positive emotions, help yourself by taking them in (see the articles on taking in at <http://www.wisebrain.org/articles.html>).

The Heartwood Institute for Neuroscience and Contemplative Wisdom

The Institute is a 501c3 non-profit corporation, and it publishes the Wise Brain Bulletin. The Institute gathers, organizes, and freely offers information and methods – supported by brain science and the contemplative disciplines – for greater happiness, love, effectiveness, and wisdom. For more information about the Institute, please go to

Fiddling the Upper Lip: Exercise #8

Last, here's a cool but kind of goofy method: fiddling with the upper lip, including producing that “blub blub blub” noise kids love to make. The evidence for it is anecdotal – mainly from people who work with horses or with troubled children who bite – but interesting.

This method could work by:

- Stimulating the PNS nerve fibers that innervate the lips, and thus send activating reverberations throughout the whole PNS.
- Triggering positive emotions associated with nursing, feeding in general, thumb-sucking, etc. Note that children and even adults can comfort themselves through touching their lips.
- Stimulating salivation, which is controlled largely by the PNS.
- Simply distracting yourself from stressful stimuli through its sheer absurdity.

Concluding Perspectives

Over the Long Haul

Many of us balance a driven and routinely stressful way of life with vacations or the occasional day off. This is a kind of “binge and purge” approach to stress management, but it is not at all effective. You cannot undo the accumulating effects of chronic stress with intermittent respites, even in Tahiti.

There is no way around it: each of us needs to have minimal chronic stress combined with a steady state of relaxed, alert, contented coping that emphasizes PNS activation with just enough SNS arousal to get the job done – whatever it is. In a single sentence, that's your best-odds prescription for a long, productive, and happy life.

Foreground and Background

Consider puffy white clouds against a blue sky: the element that's least present – the clouds – pops to the foreground and dominates the picture. And if you've ever tossed three coins to produce the six lines of the hexagram used in the I Ching, the ancient Chinese system of divination, you've encountered a similar phenomenon, this time from a great wisdom tradition: if heads represent yang (the light and active principle) and tails represent yin (the dark and receptive principle), then one head and two tails would be a yang line, since it is the yang element – in the minority – which stands out.

Words of Wisdom

Science is organized knowledge. Wisdom is organized life.

Immanuel Kant

Palden Atisha, the great Bengali saint who lived in Tibet during the eleventh century, said that the test for whether a practice is successful is whether our negative emotions have declined or not. If they have not, then it is of no use. If they have, we know we're on the right path. We can all test this for ourselves. We don't need anyone else to tell us. The path is here. . . Right here, right now, this is our place to practice. With our family our work, our social obligations/ If we cannot practice here, where can we practice? We carry our mind with us everywhere. . . Why go to the Himalayas? Why not resolve it here and now. No master can that for us. No master can ever remove our greed, anger, and jealousy. No master can remove our ego. Each of us must do that for ourselves.

Ani Tenzin Palmo

How did the rose
Ever open its heart
And give to this world
All of its beauty?

It felt the encouragement
Of light against its being;
Otherwise we all remain
Too frightened.

Hafiz

Or consider TV shows or movies which spotlight conflict and lack of communication . . . but against a backdrop of routine daily cooperation in human societies. Cooperation is so ubiquitous that it becomes the "sky" against which the clouds of conflict stand out – and capture and dominate our attention.

Recall the point made in Part One: if your SNS were shut down, you would continue to live and function (though maybe be sluggish in an emergency). But if your PNS were deactivated, you would quickly die. Your parasympathetic nervous system is absolutely fundamental to life.

The PNS is wallpaper, sky, taken for granted, undramatic, in the background. Human culture, and definitely the modern media of television and movies, are largely about the SNS. Action, conflict, sex, million dollar moments, death, crisis, fairy-tale endings, etc. are different and dramatic. It's therefore easy to start thinking that chronic stress and living awash in the SNS are what's really natural, the bedrock of existence.

But in reality, cooperation, relaxation, and equilibrium are the hub of the great wheel of life.



Three Neuro Vignettes on Reality

Rick Mendius, MD

A woman in her late seventies, with no prior psychiatric history, a relatively healthy life, and no injuries, begins to be bothered by her neighbor downstairs. Every time she turns on the exhaust fan for her kitchen or her bathroom, she begins to hear the woman singing or talking. She can't quite make out what the neighbor is saying, but she is somewhat disturbed that the opening of the vent fans somehow connects the apartments. This goes on for some months. She comes to the clinic when she hears her *own* voice in the white noise of an air conditioner; in fact, she has *not* been hearing her neighbor those previous months. She's on no medications, has no tobacco or alcohol history, and aside from a mild hearing loss, no other medical, neurologic, or psychiatric findings. Her MRI scan shows the expected number of small white matter strokes for her age (we all start collecting those in our forties), none of which is acute or particularly large. One of these small vessel strokes is in the white matter of the posterior temporal lobe on the left.

A woman in her thirties is admitted to the Epilepsy Unit for evaluation. She has a long history of epilepsy, with seizures that start with a warning – called an “aura” – and are then followed by a period of altered consciousness with a fixed, blank stare, a loss of memory, and some lip-smacking automatic behaviors. These episodes typically lasted one to two minutes, then they would stop and she would be tired for some hours. The seizures occurred several times per week, and multiple medications had not been successful in stopping them. Her neurological evaluation pointed to the right temporal lobe as the source, a portion of the temporal lobe was resected, and the seizures stopped, including the aura. What is important about the aura? For this woman, she knew she was going to have a seizure when she found herself some five to six feet behind her body watching a man come up behind her with an axe, getting ready to strike her on the head.

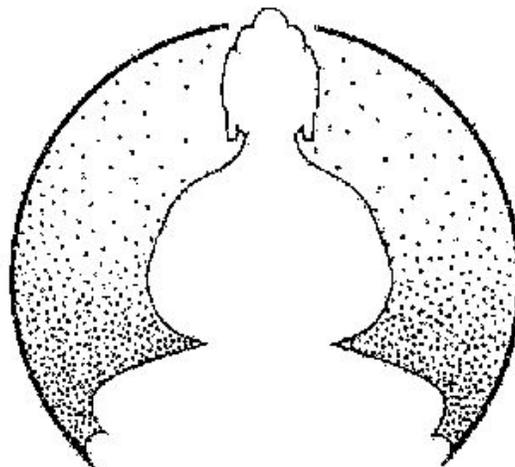
A man in his forties with a history of migraines is sitting in meditation on retreat. After an initial sense of dread, he de-

velops a splitting top-of-the head headache. There are no other neurologic symptoms or signs, and no fevers or other illnesses. This new headache comes and goes, until the meditator has a vision of being a monk attacked by a samurai who split open his head right down the center. There was a great sense of “realness” to the vision, and the man interpreted it as proof of a genuine past life event, which had profound symbolic significance for him. It was later discovered that a cancer had already started growing in his body before the retreat began – a cancer which ultimately killed him.

These three stories, among countless others in the medical literature, point to two fundamental functions of our brain. First, the experiences of living that we take for granted – like the sense of reading these words, or the sensations of the chair on your bottom, or any sounds in the background – are continually constructed by the brain. When those experiences conform to reality as it actually is, then it's easy to regard the mind as a simply a kind of window through which the “truth” passes, to be received by “me” on the other side. But when a neurological disturbance produces a seemingly real experience with no – or at most, a questionable – basis in actual reality,

then it becomes crashingly clear that the brain/mind is no transparent window at all. It's more like a magic lantern, a movie projector, and its role as the maker of apparent reality becomes obvious when a stroke or seizure or migraine wiggles “fingers” in front of the lens to cast the shape of a bird on the screen – when there is actually no bird at all.

Second, there is an area in the temporal lobes which routinely signals “this is really real” or “this is not so real.” This area is probably involved in the distinction in our experience between the “realness” of a physical event, such as the dropping of a shoe on the floor – and the “realness” of an internal thought or memory. The influence of this part of your brain is often overlooked, yet it helps decide what is a dream, what is day-to-day experience, and what is an extraordinary experience. As you go through a typical day, this region is con-



tinually evaluating the electrical, chemical, and hormonal state of your nervous system; if those physiological variables are similar to those during previous experiences of normal, everyday reality, this temporal region informs the rest of the brain – and thus, your conscious mind – that “This is real.”

Unfortunately, when this region is damaged or dysfunctional, then it’s a lot easier to mistake the unreal for the real, and *vice versa*. It is not coincidental that schizophrenics – prone to a shaky sense of the real, including misreading others, delusions, and sometimes outright hallucinations – often have marked irregularities in their temporal lobes. Nor is it a coincidence that the temporal lobes were implicated in the first two vignettes above, and possibly the third.

The third vignette is very interesting, particularly to those of a spiritual inclination. How should we interpret it? Was the man actually a monk in a former life killed by a samurai? Was the intensely vivid vision merely an artifact of a migraine (shaped, perhaps, by the spiritual setting of the retreat), and nothing more? Or, was the experience not due to a past life, but a powerful metaphor constructed by unconscious processes that sensed a lethal cancer?

Whatever your answers to these questions may be – if they are even susceptible to a definite answer – they all point in the same direction as the first two vignettes: toward the *emptiness*, in the Buddhist sense, of what seems so . . . real. It is empty because it is constructed. It is empty because every part of it depends for its existence on all the other parts and thus has

no inherent self-existence of its own. And it’s empty because it winks into and out of existence countless times each second.

It’s exciting, and scary, to let that awareness grow inside you, that your brain is creating this (apparent) reality. It’s liberating, partially because “it’s only a movie, it’s only a movie,” but more fundamentally, it’s because gaining equanimity with the concept of being at most the co-author, with your brain, of your own experience – if there is any “I” that’s an author at all! – can give you some space to appreciate the joys and endure the sorrows of this life. It’s just the way it is, being human.

Amino Acid Stress Relief

Jan Hanson, MS, LAc

A good deal of folk wisdom has preached the virtues of green tea, including for soothing frazzled nerves.

Besides the purely psychological effects of taking some time out and being nice to yourself, drinking green tea could affect your body directly through some of the natural chemicals it contains.

For example, green tea contains an amino acid called L-theanine, and in a new study (*Biological Psychology*, 2007, 74 (1), 39-45), researchers have found that taking L-theanine supplements lowers the heart rate and other reactions to stressful situations. They asked twelve study participants to do mental arithmetic under pressure – pretty tense for most of us! – and some received the amino acid and others a placebo. Even with their small sample size, the authors observed significant effects.

They theorized that L-theanine helped keep a lid on the sympathetic nervous system (SNS), that wing of your nervous system that reacts in a “fight or flight” way to challenging moments (see the article above on activating your parasympathetic nervous system for more information). L-theanine could accomplish this result because it blocks the action of a neurotransmitter, called glutamic acid, that’s involved in the activation of the SNS.

Did You Know?

“Complex organisms and brains can suffer from informational overload. In primates, about one million fibers leave each eye, carrying on the order of one megabyte per second of raw information. One way to deal with this deluge is to select a small fraction and process this reduced input in real time, while the non-attended portion of the input is processed at a reduced bandwidth.

“[Paradoxically, paying *too* close attention to some things can be a problem.] Confirming a long-held belief among trainers, athletes perform better at their highly tuned skill when they are distracted by a skill-irrelevant dual task (e.g. paying attention to the tones) than when they pay attention to their exhaustively trained behaviors.”

Christof Koch and Naotsugu Tsuchiya, *Attention and consciousness: two distinct brain processes*, *TRENDS In Cognitive Sciences*, Vol. 11 No. 1

So, if you're headed for a stressful situation, you could brew up a cup (or pot, if you're like my husband, a power tea drinker) of green tea. On the other hand, you may not want the caffeine in the tea, plus even a whole pot of the stuff won't contain a clinical-level dose of L-theanine. For that, you could take 100 – 300 milligrams as a supplement (available at most health food stores). Start with 100 mg. and see if that is enough; you can always take more, but don't go past 300 mg./day unless a licensed, knowledgeable health practitioner tells you otherwise.

And meanwhile, keep smiling when you can, and thinking about all the sweet little things in everyday life – even the busiest and most stressful.

Grateful Wonder

In Buddhism, one is encouraged to reflect on four fundamental truths, the first of which is the preciousness of a human life. Your life is precious because it offers a unique opportunity for psychological and spiritual growth, it's precious because it's one of a kind, and it's precious because it is vulnerable and fleeting.

Naturally, these reflections may draw your mind to the preciousness of life in general. In the first link below, you will find the discovery of the closest and most likely known source of life outside our solar system. The second one is about the oldest living organisms on Earth (250 million years!). And the last one explores new evidence from Australia that life began here over three billion years ago.

#1 <http://antwarp.gsfc.nasa.gov/apod/ap070402.html>

#2 <http://antwarp.gsfc.nasa.gov/apod/ap070426.html>

#3 http://www.usatoday.com/tech/science/2006-06-07-earliest-life_x.htm

For us, these perspectives contain two clear messages, which we've tried to take to heart: Don't fool around, and lighten up.

Offerings

1. On Friday, May 18, at the Kara/VA conference on "Good Grief: Vibrant Responses to Death and Loss," Rick Hanson will present a session on "Grief Recovery: Implications of Neuroscience and Contemplative Wisdom." This will be held at the SRI conference center in Menlo Park, CE credits are available, and for more information, go to www.kara-grief.org.

2. On Wednesday evening, June 13, Phillip Moffit and Rick Hanson will speak on "Taking in the Good" at Spirit Rock Meditation Center, co-sponsored by the Institute for Spirituality and Psychotherapy. Making positive experiences, ideas, and people a part of yourself is central to psychological and spiritual growth. These resources inside help you cope, feel happy, heal from trauma, and cultivate bhavana, bodhichitta, and other spiritually wholesome qualities. Phillip and Rick will explore methods for taking in the good from Eastern religions and Western psychology – and how they can support each other. And they'll discuss ideas from the new neuroscience about ways to change your brain to liberate your mind. (CE credits are available.)

3. The two Ricks (los dos Ricardos) will be teaching two daylong workshops at Spirit Rock in 2007, and you can go to www.SpiritRock.org for information and to register:

- August 11 - *The Neurodharma of Love: Using Brain Science and Buddhist Wisdom to Illuminate the Heart of Important Relationships* – Through integrating contemplative teachings about healthy relationships with current neurological research, we'll offer practical tools for activating the brain states underlying wholesome mind states of empathy, compassion, and lovingkindness. Additionally, we'll explore ways to preserve your equanimity in rough-and-tumble relationships, and to ride (gracefully) the roller-coaster of romance, sexual desire, and the

long-term shift to a calmer love.

- November 10 – *On One Wing and Two Prayers: Practicing with a Wounded Brain* – This will be taught with James Baraz, a founding teacher of Spirit Rock and the source of the fantastic Awakening Joy course. It is for people interested in well-being and contemplative depth who are also grappling with depression, significant anxiety (or trauma), ADD/

ADHD, head injury, or dementia – and for caregivers who work with them.

4. On September 8, we will do a small “dress rehearsal” of what will become an annual, inter-faith conference – working title: “This Is Your Brain on God” – applying neuropsychology to the similarities and differences in contemplative practice in Buddhism, Christianity, Judaism, Islam, Hinduism, and shamanism. We’ll use the dress rehearsal (and maybe another one) to plan the first official conference, scheduled for the Fall, 2008, in partnership with major institutions. The principal organizer of the conference is Dr. Andrew Dreitcer, a professor at the Claremont School of Theology and the Graduate University.

5. On October 6, with Christina Feldman – a senior Vipassana teacher and a wonderful person – we’ll present a workshop on deepening equanimity from psychological, neurological, and dharma perspectives. Yes, equanimity is definitely not a sexy topic. But it **is** a profound one, at the heart of both handling painful experiences and liberating the mind from clinging. Please let us know if you’re interested in this subject, and we will keep you posted with the details.

6. On Thursday evening, October 25, we will be presenters at the annual 108 Blessings fund-raiser for the Spirit Rock scholarship fund. We feel very humbled by this honor, and we encourage you to come to this event and support this worthy cause; more information will be available on the Spirit Rock website.

7. On October 26, we will be presenting a daylong workshop on “The NonDual Brain” at the Conference on Nondual Wisdom and Psychotherapy, which is co-sponsored by The Center for Timeless Wisdom, the California Institute of Integral Studies (CIIS), and other organizations. Continuing ed units will be offered, and you can register by contacting CIIS. While there will be a focus on using nondual brain tools in caregiving settings, this workshop is appropriate for anyone.

8. Probably, in 2008 and at Spirit Rock, we will co-lead the Neurodharma of Love workshop with Sylvia Boorstein. Sylvia, as you may know is quite extraordinary – sort of a cross between a Jewish grandmother and the Dalai Lama – and this workshop is likely to be quite remarkable. We’ll let you know the date when it’s solid.

