



The Wise Brain Bulletin

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

Featured Article:

Seven Facts about the Brain That Incline the Mind to Joy

by Rick Hanson, PhD, © 2007

#1 The mind and the brain are mainly (and perhaps entirely) a single unified system.

Almost every – and perhaps every – subjective state is correlated with an objective, material brain state.

Other than a transcendental factor – call it God, Spirit, Energy, or by whatever name – by definition, what else could be going on than the functioning of *matter*?

I happen to believe there is indeed a mysterious transcendental Something infusing objective and subjective reality, whose influence is subtle, profound, and full of grace. Nonetheless, it is clear to me and most neuroscientists that most if not all of our thoughts and feelings, darkest passions and loftiest dreams, poetry and imagery, chess gambits and baseball statistics and recipes and quilt patterns and earliest memories of snow – and all the other textures and aromas and shades of being alive – require and consist of neurological activity.

Think of it this way: everything we are aware of, including our own sense of self, has a one-to-one

correspondence with underlying, physical, brain structures and processes.

Just like a letter to friend or a picture of a sunset on your computer requires and represents an underlying pattern of magnetic charges on your hard drive.

First, this means that, as your experience changes, your brain changes. It changes both temporarily, millisecond by millisecond, *AND* - as we will discuss in a moment - it changes in lasting ways. For example, as just a sampling, researchers have found that:

- Different mental activities change brainwave patterns.
- People who meditate have more of the vital neurotransmitter, serotonin.
- The brains of pianists are thicker in the areas of fine motor function.
- The brains of meditators are thicker in the regions engaged with sensory awareness and with the control of attention.
- The brains of taxi drivers in London are thicker in the regions that are key to visual-spatial memories.
- Traumatic experiences shrink the part of the brain responsible for storing new memories.

- Repeated episodes of depression create marked changes in the brain that make a person more vulnerable to depression in the future.

Second, as your brain changes, your experience changes. For example, as most of us have experienced in everyday life, caffeine makes you feel stimulated and alert while alcohol makes you feel relaxed and even sleepy. A little more exotically, studies have found that:

- Activating the left frontal regions leads to a sunnier outlook and more positive mood – while strokes in those areas leave patients particularly irritable and depressed.
- Surges of the neurotransmitter, dopamine, feel very pleasurable (and why dopamine is associated with addictions).
- Damage to a cubic centimeter or so of tissue in a particular place on the left side of your brain can leave you able to understand language but incapable of generating it, while damage just a few centimeters away will have the opposite effect.
- Electrically stimulating portions of the brain can trigger memories or even out of body experiences.

And this research is mainly less than 20 years old. Consider how the invention of the microscope in the early 1600s opened up an entire new world in

its revelation of all the “tiny beasties” found in a tear drop or a bit of pond water. Yet it still took 400 years to develop the modern understanding of molecular biology and evolution, which has established clearly that life involves and consists of structures and processes of *matter*.

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

Comparable technologies for peering into the brain have been around for only a few decades, so just imagine what will be understood 400 years from now . . . or even 40.

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



This intimate intertwining of mind and matter, psyche and soma, self and brain, may seem off-putting and reductionistic at first; to put it a little graphically: “What do you mean? I’m just the *meat!*!”

Yet for me, this understanding actually provokes an incredible sense of awe, as well as gratitude that we have inherited the results of 3.5 billion years of evolutionary refinement of the machinery underlying the mind. That appreciation takes one to a sense of responsibility to make the most of one’s life, to not waste this incredible, jaw-dropping gift of human consciousness.

And this understanding of the oneness of mind and brain spotlights a fantastic opportunity for well-being, psychological growth, and contemplative depth: In hundreds of ways, large and small, you can use your mind to change your brain to benefit your mind.

#2 “Neurons that fire together, wire together.”

This famous saying, from the psychologist, Donald Hebb, refers to the fact that the activation of a particular neuronal circuit increases the strength of connections within that circuit.

That strengthening happens both during tiny time intervals – through ephemeral electrochemical changes – and over longer periods as physically observable changes occur in the brain, notably:

- Increased synaptic connections among neurons (synapses are the junctions between neurons:

tiny gaps full of a rich soup of neurotransmitters that function like microscopic switches, on/off)

- Increased thickening of the glial cells, the “scaffolding” tissues that support neurons
- Greater density of blood vessels bringing oxygen, glucose, etc. to neurons

#3 Fleeting experiences leave lasting traces in the brain.

Since the mind and brain are one, the flow of information in the mind entails a corresponding flow of electrochemical activation through the neuronal circuitry of the brain. In other words, the fleeting “stream of consciousness” leaves behind lasting marks on your brain, much like a spring shower leaves a trail of little gullies on a hillside.

For example, recall the studies mentioned above that refer to changes in the brains of pianists, meditators, victims of trauma, and cab drivers.

This means that your experiences are important not just because of their brief effects on your momentary, subjective quality of life, but also because they produce enduring changes in the physical structures of your brain. And these affect your well-being, functioning, and sometimes your physical health for days and decades to come. Which of course affects others besides yourself.

#4 Most changes in the tissues of the brain are in implicit memory.

There are two kinds of memory: Explicit and Implicit.

- Explicit - Recollections of specific events.
- Implicit - Emotions, body sensations, relationship paradigms, sense of the world

Implicit memory is different from remembering ideas or concepts: this kind of memory is in your “gut.” It’s visceral, felt, powerful, and rooted in the fundamental and ancient – reptile and early mammal – structures of your brain. The inner atmosphere of your mind – what living feels like – depends greatly on what is stored in your implicit memory.

In a basic sense, we are what we (implicitly) *remember* – the slowly accumulating registration of lived experience. That’s what we have “taken in” to become a part of ourselves. Just as food becomes woven into the body, memory becomes woven into the self.

#5 Unfortunately, the brain emphasizes negative experiences.

It’s the negative experiences that signal the greatest threats to survival. So our ancient ancestors that lived to pass on their genes paid a *lot* of attention to negative experiences.

Consider 80 million years or so of mammal evolution, starting with little rodent-like creatures dodging dinosaurs to stay alive and have babies in a worldwide Jurassic Park. Constantly looking over their shoulders, alert to the slightest crackle of

Train Your Brain

This course teaches practical, down-to-earth ways to activate the brain states that promote: Steady Awareness, Whole-some Feelings, Good Intentions, Caring Heart, and Wise Action. It is taught in a 24-month cycle that you can enter at any time. Talks and materials from past class sessions are archived at www.WiseBrain.org.

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 tax-deductible donation ranges from \$40 to zero each month. To register, contact Guisela Luster at drh@comcast.net or simply arrive fifteen minutes early.

Upcoming dates and topics:

- 3/13/07 – Awareness of the body: Coming home to your body, strengthening mindfulness, accepting and appreciating yourself as you are
- 4/10/07 – Your precious life: Being on your own side, releasing feelings of shame and guilt, establishing fundamental priorities
- 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

brush, quick to freeze or bolt or attack depending on the situation. Just like any rabbit or squirrel you may have seen in the wild today. The quick and the dead.

That same circuitry is loaded and fully operational in your brain as you drive through traffic, argue with your mate, hear an odd noise in the night, or see in your mailbox an unexpected letter from the IRS.



First, the amygdala – the switchboard that assigns a feeling tone to the stimuli flowing through the brain (pleasant, unpleasant, and neutral) and directs a response (approach, avoid, move on) – is neurologically primed to label experiences as frightening and negative. In other words, it's built to *look* for the bad. For example, when someone gives you feedback – a parent, friend, lover, or boss – doesn't your mind go to the hint of criticism surrounded by praise? (Mine sure does.)

Second, when an event is flagged as negative, the amygdala-hippocampus circuitry immediately stores it for future reference. Then it compares current events to the record of old painful ones, and if there are any similarities, alarm bells start ringing. Once burned, twice shy. Your brain doesn't just go looking for what's negative; it's built to grab that information and never let go. (If you are interested in more information on this subject, you could look at the work of Richard Davidson and others on the limbic system, or the growing literature on trauma.)

Yes, we can notice positive experiences and remember them. But unless you're having a million dollar moment, the brain circuitry for what's positive is like a paper-and-pencil pad compared to a high-powered video camera plugged into a fast computer with terabyte storage for what's negative. When you look back at night on a typical day, what do you usually reflect on: the dozens of mildly pleasant moments, or the one that was awkward or worrisome? When you look back on your life, what do you muse about: the ten thousand pleasures and accomplishments, or the handful of losses and failures?

Third, the negative generally trumps the positive: A single bad event with a dog is more memorable than 1000 good times. Speaking of dogs, you may know of the studies on learned helplessness from Martin Seligman and his colleagues, which illustrate this point in haunting ways: it took only a short time to induce a sense of helplessness in the dogs, whose brain circuitry for emotional memory is very similar to our own. But it took an extraordinary effort to get them to unlearn that training. It's as if we are predisposed to believe the worst about the world and ourselves, and to doubt the best.

Fourth, your own personal training in the negative – whatever it's been – shapes your view of the world and yourself, and your personality and interpersonal style and approach to life. (In the extreme, such as with a serious history of trauma or depression, the hippocampus can actually shrink 10-20%, impairing the brain's capacity to remember positive experiences.)

All that can lead to more of the negative showing up on your radar – either because you are scanning for it preferentially or unwittingly increasing the odds of it coming your way. Which, in a vicious cycle, can make you even more inclined to see or cause the negative in the future. Even though the actual facts are that the vast majority of the events and experiences in your life are neutral or positive! Every day, the minds of most people render verdicts about their character, their life, and their future possibilities that are profoundly unfair.

What to do about this?

#6 You can help emphasize and store positive experiences through conscious attention.

As you know from school – and corroborated by hundreds of studies – you remember something best when you make it as vivid as possible and then

riod.

That's exactly how to register positive experiences in your implicit memory. Which will slowly but surely change the interior landscape of your mind.

Three Simple Steps:

(1) Help positive events become positive experiences.

You can do this by:

- Paying attention to the good things in your world, and inside yourself. So often, good events roll by our eyes without us noticing them. Instead, you could set a goal each day to actively look for beauty in your world, or signs of caring for you by others, or good qualities within yourself, etc.
- Deciding to let yourself feel pleasure and be happy, rather than feel ascetic or guilty about enjoying life. In particular, release any resistance for feeling good *about yourself*. You've earned the good times: the meal is set before you, it's already paid for, and you might as well dig in! You are just being fair, seeing the truth of things. You are not being vain or arrogant - which distort the truth of things.
- Opening up to the emotional and sensate aspects of your responses to positive events, since that is the pathway to experiencing things.
- Sometimes doing things deliberately to create positive experiences for yourself. For example, you could take on a challenge, or do something nice for others, or bring to mind feelings of compassion and caring, or call up the sense or memory of feeling contented, peaceful, and happy.

(2) Extend the experience in *time* and *space*:

- Keep your attention on it so it lingers; don't just jump onto something else. Notice any discomfort with staying with feeling good.
- Let it fill your body with positive sensations and emotions. (That's the space part.)
- In sum, savor, relish the positive experience. It's delicious!

Offerings

1. Check out a short video of Rick Hanson talking about the brain on the Starfish Health website, at <http://www.starfishpartners.com/provider/profile/videos.php?providerUId=175&clipUId=19>

2. Rick Hanson and Rick Mendius will be teaching several daylong workshops at Spirit Rock Meditation Center in 2007. Go to www.SpiritRock.org for information and to register.

Details are being worked out, but “the Rick and Rick show” will likely present:

- The Neurology of Awakening and the Awakening Your Brain daylongs as a combined weekend, currently scheduled for August 11 and 12. This covers how to cultivate the brain states supporting the classic steps taught by the Buddha for great depth of awareness – “steadying the mind internally, quieting it, bringing it to singleness, and concentrating it” – in the service of liberating insight
- On One Wing and Two Prayers: Practicing with a Wounded Brain – This will be taught on November 10 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.



3. On October 6, 2007, 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 topic, and we will keep you posted with the details.

give it heightened attention over an extended pe-

(3) Sense that the positive experience is soaking into your brain and body - registering deeply in emotional memory.

- Perhaps imagine that it's sinking into your chest and back and brainstem. Maybe imagine a treasure chest in your heart.
- Take the time to do this: 5 or 10 or 20 seconds. Keep relaxing your body and absorbing the positive experience.

#7 Positive experiences have many important benefits.

In General

- Emotions organize the mind as whole, so positive feelings have global effects.
- They lower the stress response in your body by dampening the arousal of the sympathetic nervous system (the "fight or flight" wing) and by activating the parasympathetic nervous system (relaxed and contented). For example, positive feelings reduce the impact of stress on your cardiovascular system.
- They increase psychological resilience.
- They lift mood and protect against depression.
- They promote optimism – another bulwark against depression.
- Over time, they help counter-act the effects of trauma or other painful experiences. When you remember something painful from your past, your brain first reconstructs that memory – including its emotional associations – from a few key elements, and then it reconstitutes it in storage *with tinges of your state of mind at the time you recalled it*. This means that if you recall an event repeatedly with a dour, glum cast of mind, then your recollection of it will be increasingly shaded negatively. Alternately, you recall it repeatedly with a realistically upbeat state of being, then it will gradually come to mind more and more with a more neutral quality: you will not forget the facts of whatever happened, but their emotional charge will slowly fade – and that can be a great relief.
- They highlight key states of mind so you can find your way back to them in the future. So you can more readily tap into peace, contentment, feeling strong, well-being, lovingkindness, etc.
- They reward you for doing something that's noble but not always easy, and thus support your

ongoing motivation.

For Children

- All of the benefits above apply to kids as well.
- In particular, children who are in the spirited range of temperament really benefit from deliberately slowing down to take in positive experiences, since they tend to move along quickly to the next thing before the previous good feelings have had a chance to consolidate in the brain.
- Similarly, children in the anxious/rigid range of temperament also benefit from consciously soaking in good feelings, since they tend to ignore or downplay the evidence for those positive experiences.

For Contemplative Practice

- They promote steadiness of mind, necessary for any fruitful meditation.
- They support the deep states of absorption that are both blissful and profoundly insightful. For example, the high levels of dopamine associated with joy help keep the "gate" of awareness shut to being flooded by new experience, and thus support concentration.
- They build confidence in the fruits of one's efforts. Conviction is a major engine of practice and perseverance; for example, in Buddhism, it is one of the factors of enlightenment.
- Fundamentally, you are cultivating wholesome qualities in your mind and heart, and both crowding out and replacing negative ones.

Conclusion

The innate neurological circuitry of your mind poses a very real challenge: positive stimuli tend to roll through it while negative stimuli get flagged

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 drRH@comcast.net.

and captured and deferred to. But you can consciously override those tendencies in simple and effective ways each day, by focusing on positive experiences, valuing them, and helping them sink in.

That's a deeply wise and wonderful undertaking: happiness is skillful means. And happily for happiness, this is aligned with your deepest nature: awake, interested, benign, at peace, and quietly inclined to joy.

Making It Up As You Go Along

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Introduction

You've probably seen optical illusions such as the Necker cube or the Faces/Vase pattern. At a simple level, these are pleasant, "that's cool but so what?" kinds of experiences.

Yet if you look deeper, these illusions reveal how your brain is constantly making up a picture of the world that is useful for survival – but often highly selective and distorted. Seeing the *constructed* nature of so-called reality may feel disorienting at first, but it's also a great way to take our own viewpoints less seriously, and to have more space for the perceptions and opinions of others.

So, for fun and education, each issue of the Wise Brain Bulletin will include an interesting illusion and a discussion of what is going on inside your brain as you look at it.

A Little Primer on Vision

The anthropologist Gregory Bateson defined information as "a difference that makes a difference." If your stomach is designed to process food, your brain is designed to process information. Therefore, your brain must continually identify differences – even to the point of exaggerating them itself.

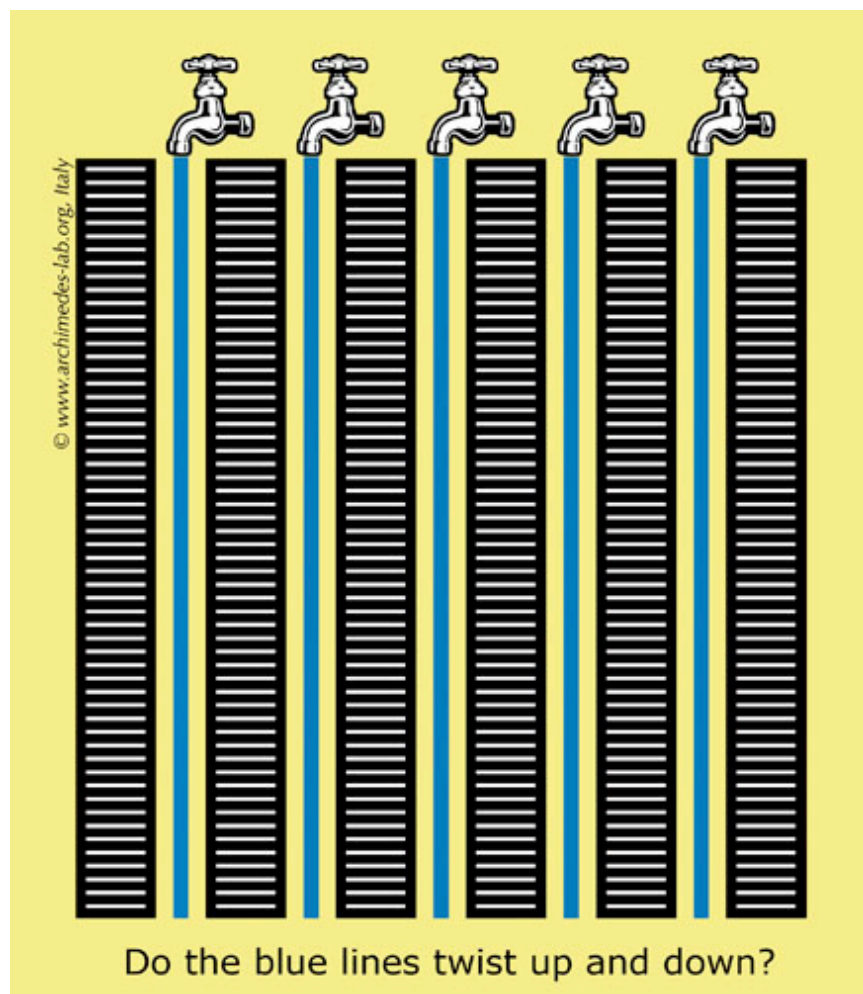
For example, that's how you see the edges of any-

thing, from the contours of the letters in the words you're reading right now to the placement of a golf ball you're about to hit off a tee to the dark parts of a crescent moon against a starry sky.

That's because when you look at something like the picture of the Faucet Illusion on this page, light bouncing off the object travels through the lens of your eye to land on certain spots on your retina. The neurons there – literally touched by light – are stimulated to fire. At the same time, nearby neurons are *inhibited* from firing.

On the Edge

This strengthening of the difference between the neurons that are firing and those that are not intensifies the contrast in the brain, and thus the mind, between what's perceived as "object" and what's "not-object." That helps highlight its edge, where it ends and the rest of the world begins, which makes



shapes easier to detect. And all that happens inside your eyeball, before the signal moves deeper into your brain for further processing!

To observe this in action, look at a white sheet of paper on a dark gray or black background. Pay close attention to the half a millimeter or so right next to the edge of the paper. Right there, the white will be slightly whiter, and the black/gray will be slightly darker.

This neurological activity – called “neighbor inhibition” – is used widely in the brain to enhance sensory processing of sounds, touch, etc. On a much larger scale, analogous methods are used to emphasize one’s own thoughts and feelings and wants, and group identifications, and self compared to those of other people.

These methods include ignoring others, tuning them out, downplaying their needs, regarding them (as Martin Buber described) as an “it” to your “I,” viewing them as inferior, etc. It’s a little haunting to consider how the processes that help you grasp the handle of your tea cup instead of the air next to it, when layered in complexity and writ large, can lead to everyday failures of empathy as well as large-scale prejudices and discrimination.

The Illusion of Motion

Looking at the Faucet Illusion, you *know* that nothing is moving on the page – but it sure looks like it! And especially a few degrees away from the point of the drawing that your vision is fixed upon. Why does it seem like the water is flowing?

This sort of illusion occurs with sharp contrasts in color or texture, especially if they are close together. They cause a sense of motion in the optical cortex as the result of three processes coming together:

- The intense highlighting of edges
- The emphasis throughout the visual system on tracking *motion* in your peripheral vision – “out of the corner of your eye” – since that often signals threats to survival or opportunities for food
- The continual, slight movement of the point

of visual focus, which causes nearby edges to move across the peripheral retina

In other words, as the “camera” of your gaze moves ever so slightly, your brain interprets that as the *world* moving . . . and that’s why those blue lines seem to wiggle like water.

Conclusion

The bottom line is that our visual universe – and remember, we are a highly visual animal – is constructed from electrical inputs from the retina, is processed with evolution-selected biases for motion, color, and target selection, and is shaped by our prior biases and expectations.

Knowing these facts gives us at least a measure of control in our decisions, since we can insert a pause between “see” and “react” if we practice restraint and continue to

hold our visual perceptions as a constructed data set and not a reality.

Words of Wisdom

The principal activities of brains are making changes in themselves.
Marvin L. Minsky (*Society of Mind*, 1986)

Anything less than a contemplative perspective on life is an almost certain program for unhappiness.
Father Thomas Keating, February 21, 2007, Berkeley, CA

To abstain from all evil, to cultivate the wholesome, and to purify one’s mind: that is the instruction of the Buddhas.
Dhammapada (183)

Biochem Corner:

The Best Natural Treatments for Depression

© Jan Hanson, MS, LAc, 2007
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In response to some good questions I’ve gotten lately, I’m going to list my top natural treatments for depression.

Do Step #1 For Sure

1. Take omega-3 fish oil.

The membranes in the brain are largely made from the long chain oils, EPA and DHA, which are found in fish oil. They are not only safe, but essential for everyone: that is why these are called “essential fatty acids.”

- Use a fish oil that is molecularly distilled, to remove heavy metals and toxins. Take enough capsules to give you at least 500 mg. each of EPA and DHA; you will be able to figure out the number of capsules from the label on the bottle. If you have very dry skin, consider increasing your dose by up to 100%.

2. Enhance key B-vitamins.

The most important of these are vitamin B-12, folic acid, and vitamin B-6.

B-12 and folic acid are essential for a vital metabolic process called methylation, which activates many important brain chemicals. B-12 is found in animal products, and vegetarians are often lacking in this nutrient.

- B-12 must be taken sublingually (under the tongue), and the form called methylcobalamin is best. Take at least 1000 mcg./day, and many people get benefits with much higher dosages, like 5000 mcg./day.
- Take at least 800 mcg./day of folic acid, and some people benefit from dosages several times higher.

Getting enough vitamin B-6 is a particular issue for women taking birth control pills who have depression as a side effect of the pill. B-6 is also important for converting amino acids into neurotransmitters.

- Take 50 mg. of Vitamin B-6.
- Pyridoxal-5-Phosphate (P-5-P) is the active form that the body uses, and you may get more benefit from taking it in this form.

3. Optimize iron.

Iron deficiency is a cause of fatigue and depression. This can be checked on a routine lab test for ferritin or iron saturation. Women who are having menstrual periods are at the highest risk. It is always good to check your iron levels before taking supplements, because too much iron can be a problem.

- If you are low in iron, you can take up to 60 mg./day. Retest in several months, and decrease your dose when your levels of iron normalize.

4. Make sure you have healthy thyroid levels.

If you have low mood combined with fatigue, please have your thyroid hormone checked immediately. This hormone is critical for directing the body’s basic metabolic rate, and deficiencies can cause depression, fatigue, and a myriad of other symptoms.

The best all-round measure of your thyroid levels is TSH – thyroid stimulating hormone. TSH is the body saying - “Make more thyroid, make more thyroid” – so the higher your TSH, the lower your thyroid levels.

Unfortunately, there is wide disagreement about healthy levels of TSH. The conventional medical view is that TSH levels as high as 4 or 5 are perfectly fine. On the other hand, the European standard, shared by many holistically-oriented physicians in the U.S., is that when symptoms such as fatigue, depression, or feeling cold are present, then any TSH levels above 3 or so are cause for concern, and for intervention or further investigation.

I believe that if you are tired and have depressive feelings, and have low or marginal levels of TSH, you should seek professional care.

- To take thyroid hormone, you must work with a physician who can prescribe it.

Perspectives on Self-Care

Be careful with all self-help methods (including those presented in this Bulletin), which are no substitute for working with a licensed healthcare practitioner.

People vary, and what works for someone else may not be a good fit for you. When you try something, start slowly and carefully, and stop immediately if it feels bad or makes things worse.

5. Exercise.

Get regular aerobic exercise. Many people are able to forgo medication because they exercise regularly.

Consider Doing Step #2

If you’ve done step #1 for a few weeks and still feel depressive, or if you simply want to jump in quickly, you could explore the more intensive interventions here.

1. Try 5-HTP.

5-HTP, a metabolite of the amino acid, tryptophan, is the immediate precursor of serotonin, a key neurotransmitter. The more I learn about serotonin, the more certain I am that it is usually the most important neurotransmitter to enhance for psychological issues.

- Start with 50 mg. on an empty stomach, and slowly increase over a couple of weeks. You can go as high as about 200 mg., but stop when you feel good, or when increasing the dose doesn't add any

additional benefits.

- Do NOT take this supplement if you are already on a serotonin-focused antidepressant (e.g., Prozac, Zoloft), unless you are working with a licensed health care provider who directs you to do so.

2. Try L-tyrosine.

If you have taken 5-HTP for several weeks and you still feel a kind of energy or mood slump, then try tyrosine. This amino acid is the immediate precursor to dopamine and norepinephrine, which are enlivening and stimulating neurotransmitters.

- Start with 500 mg./day on an empty stomach in the morning, and possibly increase to 1000 mg./day.

- Caution #1 – Tyrosine can be over-stimulating. If you tend to be the anxious, frazzled type, you might want to stay away from this supplement – or proceed very cautiously.

- Caution #2 – Tyrosine should not be combined with medications that increase norepinephrine and/or dopamine (for example, Wellbutrin, Cymbalta, Effexor) unless you are working with a licensed health care provider who directs you to do so.

3. Get the sugar totally out of your diet.

It is amazing how much a diet that has sugar in it can cause depression – the sugar blues. It is very hard for people to do this, but the results are often dramatic.

Neurology Nuggets

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Time and Your Inner Clocks

We appear to have two clocks in our heads. We can't accurately tell time differences between sounds less than a quarter of a second apart, so that appears to be the lower limit of clear separation of sounds.

Between 250 milliseconds and 500 milliseconds, your brain can tell the difference, but doesn't check the time to decide if events are separate. It processes the two events as a single stimulus, and separates them by the way the sounds disturb each other, like the way water waves from two pebbles interfere with each other.

Above 500 milliseconds, the internal clock in the basal ganglia becomes the reference for intervals up to hours. This is true for both motor and sensory processes.

If you "think" about it, that may be why things that happen quickly seem to be so unified, so "in the zone.". The brain is looking at things as one piece of data, and processing it all at once.

(refs: Dean Buonomano and Uma Karmarkar, *Neuron*, Feb 2007. Warren Meck, *Scientific American*, Feb 2007. Corby Dale, *Scientific American*, Feb 2007)

Fare Well

May you and all beings be happy, loving, productive, and wise.

From Our Contributors

The Business of Living

The business
Of living

Does not
Advertise

It has no opening
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