

## YOU AND YOUR NERVOUS SYSTEM:

*How stress affects your body*

**S**tress is a fact of life. We all experience challenging situations that call on us to take action. As I explained in one of my previous newsletters, not all stress is bad — in fact, some stress is necessary for life. However, too much stress makes the nervous system go haywire. Over time, it can cause harmful chemicals to accumulate in your body. Gaining an understanding of these effects and what can counteract them can help you make more informed choices about how you take care of yourself.

**Automatic pilot**

In order to understand how stress affects the body, we need to look at the nervous and endocrine systems. Our nervous system is divided into two parts: the somatic system, which has to do with consciousness, intelligence, and decision-making; and the autonomic nervous system, which functions as our “automatic pilot.” The autonomic nervous system, or ANS, controls the basic processes that keep us alive, all hidden below our level of consciousness. The beating of your heart, the acidity of your stomach, and the amount of sugar in your blood are all regulated by the ANS, leaving you time to do more interesting things (like reading this article). Some autonomic functions have a manual override option so you can *decide* to blink your eyes or take a deep breath, but these things usually happen whether you think about them or not.

The autonomic nervous system is also divided into two parts: the sympathetic nervous system, or SNS, and the parasympathetic nervous system, or PNS. The sympathetic nervous system helps us to respond to stressors, like a near-miss on the highway or a demanding boss, while the parasympathetic nervous system helps us to recover from stressors. These components of our automatic pilot help us to sort out our responses to things that happen to us. The brain interprets a stimulus, like a sharp pain or a soothing caress, and creates a response in the body. For instance, we will probably have a sympa-

thetic response to a wasp sting and a parasympathetic response to a back massage. Most of it happens below the conscious level.

**The sympathetic reaction:  
“Watch out: here it comes!”**

The sympathetic, or “fight or flight” branch of the nervous system gets a lot of attention these days, because we’re all becoming more aware of how stress affects our lives. The sympathetic nervous system *enforces* stress on the body: it causes our hearts to pound, our blood pressure to soar, and adrenaline to flood our system. In a sympathetic response our muscles tense up for running or fighting. We get a dry mouth and an upset stomach. In short, we direct fuel and energy toward large muscles and away from internal organs.

Although it may seem like these are all bad things, they’re really not. These responses give our body the best possible chances of survival in the face of physical danger. Without these lightning-fast reactions to threats in our world, we couldn’t possibly survive. The problems begin when the sympathetic response becomes “normal”; we’re simply not designed to live that way! When we do, our bodies start to wear out faster and faster and become unnecessarily fragile.

**“Fight or flight” chemicals**

During a sympathetic reaction, many different hormones are secreted by the adrenal glands. The two that have the greatest impact on every aspect of our health — from the chemistry of our blood to the tension in our muscles — are *adrenaline* and *cortisol*.

*Adrenaline* reinforces the fight or flight reaction by giving chemical orders all over the body to help us react quickly to threatening situations. It raises blood pressure, increases the heart rate and the respiratory rate, shuts down the digestive system, directs blood to the biggest muscles for quick action, and tells the liver to release stored sugar into the blood for extra fuel.

*Cortisol* is secreted by the adrenal glands in response to long-term stress. It is commonly found in elevated levels in the blood under very stressful conditions. Patients in burn-rehab hospitals have high levels of cortisol, as do those who are clinically depressed. It is the main substance

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# How stress affects your body

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that is measured as an indicator of long-term stress. When it lingers in the body for prolonged periods, cortisol has been seen to weaken many types of tissue — especially muscles, tendons, and ligaments — raising the risk of chronic back, neck, and other injuries. It can also suppress the immune system, making it more difficult for us to heal when we are injured and making us more vulnerable to getting sick. But when it is secreted in moderation, cortisol is a very beneficial chemical that acts as a powerful anti-inflammatory agent. In fact, man-made versions of cortisol, called corticosteroids, are frequently prescribed to treat inflammatory conditions.

There is a tendency to view both adrenaline and cortisol as dangerous, harmful substances, just as we tend to view the sympathetic nervous system as the source of all our problems in this stressful world. But the fact is that these chemicals are important to our health. It's true that when too much adrenaline or cortisol floods our system for a long time, we can get seriously ill or become vulnerable to pain and injury. But without these chemicals we would also have serious problems. The human body works best in a constant, shifting, dynamic balance. Too much or too little of *any* hormone throws us out of that balance.

## The parasympathetic nervous system: "Whew! I'm glad that's over!"

The sympathetic nervous system is designed to work in concert with mechanisms that help us recover from our emergency mode. Those mechanisms are under the control of the parasympathetic nervous system (PNS). This system, which is run almost entirely by one huge nerve dangling from the brain down into the chest and abdomen, undoes our "fight or flight" responses. It slows the

heart rate, drops blood pressure, re-routes blood back into internal organs, and contributes to an overall feeling of pleasure and well-being. These are all things people experience when they engage in stress-reducing activities like regular therapeutic massage, daily exercise, yoga, and meditation.

On a chemical level, the PNS suppresses the release of adrenaline, cortisol, and other stress hormones to return us to a healthy stress response, as well as stimulating the secretion of other substances that improve and deepen sleep. It also strengthens our immune response and improves our resistance to injury and disease. Once again, all these functions are important, but you *can* have too much of a good thing. Without the sympathetic nervous system to provide balance, we wouldn't have the alertness we need to drive a car, play a sport, or even walk down the street.

## The balancing act

The balance between the parasympathetic nervous system and the sympathetic nervous system is *not* a battle between good and evil in which one must triumph while the other suffers defeat. It is an ongoing, constant shifting from one state to the other — always, we hope, in proportion to the kinds of stimuli that surround us. The only problem is, this system was designed for people who lived around 40,000 years ago. Back when we were all hunter-gatherers, we could live for long periods with very little stress, and for short periods with very high stress (like when we were being chased by a bear). Our body is perfectly adapted for this lifestyle, but it's no longer how most people live. Consequently, the average stockbroker has a stress response system that is better suited to

running away from a bear than to losing \$5 million on the exchange floor.

Probably the greatest difference we have in the stressors we deal with today, compared to our hunter-gatherer ancestors, is that we look at paying rent, passing an exam, or meeting a deadline in the same way that our

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Therapeutic massage helps our tissues to exchange stress hormones and other waste products for fresh nutrients

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ancestors saw attacking carnivores or the threat of tribal famine. In other words, they dealt with physical stressors, but we deal primarily with psychological stressors. Our bodies go through all the same chemical and neurologi-

cal changes that theirs did, but we don't have the physical outlets that help to get rid of the stress-related chemicals we secrete. *Action*, like running or fighting, helps the body to flush out and neutralize stress hormones. So does therapeutic massage, as it helps the tissues to exchange waste products for fresh nutrients. It is these hormones, when they accumulate for prolonged periods that can make us seriously ill.

The fact remains that not only are we destined to have some stress in our lives, but we would get sick without any at all. The trick is to find a way to monitor our stressors to make us stronger and more versatile while building in regular activities to reduce our stress to normal levels. This may include changes such as starting a daily exercise regimen alternating between aerobic, strength building, and flexibility exercises; having weekly massage therapy sessions to reduce cortisol levels; and sitting down for three balanced meals a day in a relaxed environment instead of eating on the run — in short, creating a life that is *lived* instead of rushed through.

—Ben Benjamin, Ph.D., & Ruth Werner

## Stressful conversations

People are fundamentally social creatures. We spend much of our lives interacting with other human beings. Therefore, it only makes sense that many of the stresses we face are social stresses. We're faced with some degree of stress every time we have disagreements, deal with strong emotions, or work together to solve difficult problems or make tough choices. All of these interactions require us to talk with other people, which means that in addition to the main problem we're trying to solve (such as making a decision or making our relationship work better), we have the additional challenge of how to communicate with each other.

As long as everything is going well, it can seem as though communication isn't that much of a challenge. When there's something we want to say, we just say it, and this works just fine. The trouble comes when we find ourselves in a conversation that doesn't go well — whether it's an unproductive meeting or a bitter argument. It's easy to place the blame on the content of our discussion, *what* we're communicating about. We may conclude that we're in an impossible situation; we have irreconcilable differences, or our issues simply cannot be resolved. But the truth is, the biggest problem is in *how* we're communicating.

Conversations about stressful topics tend to go badly because *when we're under stress, the way we communicate tends to change*. The primary change you'll see as stress rises is a switch to communication with more *noise*, which accompanies the activation of the sympathetic nervous system.

In information theory, the term *noise* refers to anything that makes it more difficult for a message to get through. It's like static on your radio or cell phone, getting in the way of the information that's being sent. In verbal communication (talking), there are three types of noise: ambiguity, contradiction, and redundancy. In an ambiguous communication, the meaning is not clear. (For instance, if I say, "That's an unusual idea," it's not clear whether I like the idea or not.) In a contradictory communication, two conflicting pieces of information come through at once. (For instance, if I say sarcastically, "Yeah, right — that's a *great* idea," my words say I like the idea but my tone says I don't like it at all.) In a redundant communication, the same thing gets said over and over again, and we tend to stop listening. Each of these types of noise will tend to increase the listener's stress. The result is a vicious cycle: Stress contributes to noise, which increases stress, which then leads to more noise, leading to more stress, and so on.



It's possible to reduce noise in a conversation, but it takes skill and work. Imagine that someone says to me, "How could you make such a stupid mistake?!" This is a righteous question, which is inherently contradictory — its

grammatical form is that of a question, but its content is a personal attack. It would be easy to react with another noisy communication like self-defense ("I was only trying to be helpful") or counter-attack ("Look who's talking! You screwed up big-time last week.") In contrast, it would take much more energy to say with feeling, "I can hear that it was really frustrating to see me make that mistake" (mirroring).

What mirroring does is to *process* information — specifically, emotional information (in this case, frustration). It demonstrates that we're hearing and directly responding to what has been said. There are also various other ways to process information, including summarizing, answering questions, and expressing agreement. All of them tend to reduce noise, acting as an antidote to ambiguity, contradiction, and redundancy. Each requires some effort: processing takes work. But there is a valuable payoff. Reducing noisy communication not only helps reduce stress as the conversation goes on, but also increases the potential for shared understanding, problem solving, improved morale, and better relationships.

### Want to learn more?

This article is based on the principles of SAVI® (the System for Analyzing Verbal Interaction), which has been used for 30 years to help individuals, couples, and organizations improve their communication. I am a certified SAVI trainer and am currently teaching it throughout the country, in settings including hospitals, churches, schools, and corporate offices. If you'd like to learn about SAVI trainings or read more articles on this subject, contact me at [ben@mtti.com](mailto:ben@mtti.com) or 617-576-0555.

### Recommended Reading

#### Stress and Stress Management

Benson, H. (1975). *The relaxation response*. New York: William Morrow and Company, Inc.

Kabat-Zinn, J. (1991). *Full-Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness*. New York: Delacorte Books.

Sapolsky, R.M. (1998). *Why Zebras Don't Get Ulcers*. New York: W.H. Freeman & Company.

#### Communication Skills

Rosenberg, M.B. & A. Gandhi. (2003). *Nonviolent Communication: A Language of Life*. Del Mar, CA: Puddle Dancer Press.

Simon A, & Y. M. Agazarian (2000). "SAVI — the System for Analyzing Verbal Interaction." In *The Process of Group Psychotherapy: Systems for Analyzing Change*, Beck, A. P. & C. M. Lewis (Eds), Washington, DC: American Psychological Assn, 357–380.

Simon, A. & B. Benjamin. "The Anatomy of Communication: How Understanding Can Transform Our Professional Interactions." *Massage & Bodywork*, February/March–April/May 2007.

Stone, D. et al. (1999). *Difficult Conversations: How to Discuss What Matters Most*. New York: Viking Penguin.

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### LISTEN TO YOUR PAIN... AGAIN!

I'm excited to report that my book *Listen to Your Pain* is currently being updated for a second edition. The first edition has sold nearly 58,000 copies.

The information contained in the book has stood the test of time and remains an accurate, practical guide to pain and injury problems. For this edition, I've also added 70 pages of brand new information. In addition to new text, these pages include 116 new drawings by Norman Campbell, the same wonderful artist who did the original illustrations.

The added section provides detailed guidelines for the assessment and treatment of 30 of the most common injuries throughout the body. This is important information both for hands-on therapists and for others seeking help with their own injuries. Therapists can use this as a handy reference guide to assessment tests, exercise programs, and treatment techniques to use with their clients. Other readers will get an insider's look at the most accurate assessment methods available and the range of treatment options they might consider — as well as instructions for useful exercises they can do on their own.

If you're interested in learning more or purchasing a copy of the new edition, please contact me and I'll let you know as soon as the book hits the shelves.

### Injury Workshops for Yoga Teachers

As most of you know, I've been training massage therapists, personal trainers, and exercise instructors for many years on topics including injury assessment and treatment, ethics, boundaries, and communication skills. Recently I decided to expand my focus and develop courses for yoga teachers. The first of these workshops, Injury Anatomy of the Shoulder for Yoga Teachers, was a big success. There was a large turnout, and the participants were enthusiastic to learn more about how to help students with injuries. I'll be teaching another yoga-oriented workshop (focused on the knee) in early July, and hope to add trainings on other body areas in the fall.

### Breast Thermography

I want to bring readers' awareness to a breast cancer screening method that has recently come to my attention. Breast thermography is a completely noninvasive procedure that is FDA approved for safety. It is in common use in other countries including Japan, Germany, and Sweden, and has been gaining popularity within the United States. When used in conjunction with conventional screening methods, it has been shown to boost breast cancer detection rates up to 95%. It is also the earliest form of detection available — able to show warning signs of disease far in advance of invasive tumor growth. Women can get information about developing pathology years before other procedures show any abnormalities. For a disease where early detection is key to successful treatment, this is a critical advantage.

Breast cancer thermography is available in the Boston area through Jackie Bell Natural Health. For more information, visit [www.naturalbell.com](http://www.naturalbell.com), email [jackiebell@naturalbell.com](mailto:jackiebell@naturalbell.com), or call 508-280-6434.