

A Harvard Medical School Special Health Report

# Stress Management

*Approaches for preventing and reducing stress*



## **In this report:**

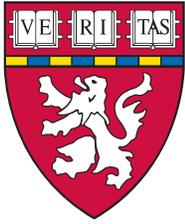
Mini-relaxations for quick stress relief

How stress affects your brain, heart, and lungs

The positive side of stress

## **SPECIAL BONUS SECTION**

Your portable guide to stress relief



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SPECIAL HEALTH REPORT**

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*Trusted advice for a healthier life*

Dear Reader,

Glance at the 10 leading causes of death in America, and you won't find the word "stress" anywhere. Yet many well-respected studies link stress to heart disease and stroke—the No. 1 and No. 3 killers, respectively, in the United States. There is evidence that stress may influence cancer and chronic lower respiratory diseases—which are also among the top five leading killers.

Stress has implications for many other ailments. Depression and anxiety can be caused or exacerbated by stress. Stress also triggers flare-ups of asthma, rheumatoid arthritis, and gastrointestinal problems, such as irritable bowel syndrome. And illness is just the tip of the iceberg. Stress affects you emotionally as well, marring the joy you draw from life and loved ones.

What is stress? For one thing, it's not all bad. Your perception of a real or imagined threat can spark the stress response, a physiological cascade that prepares the body to fight or flee. That swift reflex was encoded in you for survival and can save you from injury or worse. It's a rush of hormones that spurs you to jump out of the path of a speeding car, flee from a menacing wild animal, or quickly douse a small fire. Stress has another positive side as well. Researchers have found that as stress or anxiety increases, so do performance and efficiency—at least initially. At a certain point, though, rising stress becomes detrimental, and performance and efficiency decline.

Trouble usually brews when your stress response is evoked repeatedly, causing unnecessary wear and tear on your body that can lead to poor health. In a world bursting with situations that can cause stress—traffic jams, layoffs, illness, and money woes—it's not surprising that people experience stress frequently. Certainly, no one can completely avoid stressful situations. Yet it's entirely possible to learn to better manage these situations.

It's our hope that this report can help you do just that. Reading it will help you identify your stress warning signs and learn how to better manage stressful situations. In these pages, you'll find a variety of tools you can use to accomplish that task. Your job is to decide which tools fit you best and to start using them. (Of course, before you use any of the techniques described in this report to treat a health condition, you should consult with your doctor.)

As the saying goes, Rome wasn't built in a day. It took time to raise the scaffolding that supports the negative cycles of stress in your life, and learning to dismantle it will also take time. Yet your efforts can reward you richly with better health, greater peace of mind, and a smoother, more joyful course through life.

Sincerely,

Herbert Benson, M.D.  
*Medical Editor*

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*Medical Editor*

# Understanding the stress response

**J**ust what is stress? Does it have positive attributes? How have decades of research shaped current theories on stress? This section answers these questions and touches briefly on how stress affects the body. The list titled “My stress warning signs” (page 8) will help you identify how you feel when faced with stressful situations in your own life.

## What is stress?

You may define stress as bumper-to-bumper traffic, a deadline bearing down fast, a worrisome illness, or a contentious argument with your spouse. A friend may define it as a relationship spiraling downward, the need to care for an ailing parent, or a pile of unpaid bills.

If you were a medical expert, though, you would label these scenarios stressors—that is, examples of stressful events and circumstances. Stress itself can be defined more broadly as an automatic physical response to any stimulus that requires you to adjust to change. Whether it’s a sudden car crash, a loud argument, or the ache of rheumatoid arthritis, each real or perceived threat to your body triggers a cascade of stress hormones that produce well-orchestrated physiological changes.

All of us know these sensations intimately. Your heart pounds. Muscles tense. Breathing quickens, and beads of sweat appear. But exactly how and why these reactions occur and what effects they might have over time are questions that have intrigued researchers for many years.

Harvard physiologist Walter B. Cannon was a pioneer in exploring the biochemistry of stress. His research nearly a century ago convinced him that fright was not all in the mind, but also stemmed from the adrenal glands, which sit atop the kidneys. During experiments with barking dogs and caged cats, Cannon was able to isolate a hormone secreted by the adrenal glands of the frightened cats. When he

injected that hormone into a second, perfectly calm cat, it touched off a physical reaction of fear. The cat’s heartbeat and blood pressure shot up, while blood flow to the muscles increased. Cannon dubbed this occurrence the “fright, fight, or flight” response. Currently, though, it’s known as “fight or flight” or the “stress response.”

## The stress response

The initial hormone Cannon isolated was epinephrine. It’s also called adrenaline, after the glands that manufacture it. Next, Cannon found a second stress-response hormone called norepinephrine, or noradrenaline. Other researchers discovered cortisol, which belongs to a second class of stress hormones (known as glucocorticoids) that play key roles in the stress response.

The stress response starts with a signal from the part of your brain called the hypothalamus. Perched above the brain stem, the hypothalamus is a network of nerves wired to the rest of your body through the autonomic nervous system. The autonomic nervous system rules such involuntary body functions as breathing, blood pressure, heartbeat, and the dilation or constriction of key blood vessels and small airways in the lungs called bronchioles. Its two tributaries are the sympathetic nervous system, which revs up the body in response to perceived dangers, and the parasympathetic nervous system, which calms the body after the danger has passed.

When the hypothalamus processes certain information—perhaps the sight of your boss bearing down with an ominous expression, or the sound of screeching car tires behind you—it sends a chemical messenger called corticotropin-releasing factor (CRF) down a pathway to the nearby pituitary gland (see Figure 1). This stimulates cells in the pituitary to send their own chemical messenger, adrenocorticotropic hormone (ACTH), to the adrenal glands, which spill cor-

tisol into the bloodstream. Surges of adrenaline and noradrenaline are also released by the adrenal glands on instructions from the brain and simultaneously throughout the body by the sympathetic nervous system. (The powerful triumvirate of the hypothalamus, pituitary gland, and adrenal glands is dubbed the HPA axis. It governs a multitude of hormonal activities in the body and provides a feedback loop that helps switch off the stress response when levels of certain hormones are too high.)

Stress hormones race through your bloodstream to different parts of your body, preparing you to fight or flee. Your breath quickens as your body takes in extra oxygen. Energy-boosting glucose and fats are released from storage sites into your bloodstream. Sharpened senses, such as sight and hearing, make you more alert.

Your heart beats faster—up to two to three times as quickly as normal—and your blood pressure rises. Certain blood vessels constrict, which helps direct blood flow to your muscles and brain and away from your skin and other organs.

Blood cells called platelets become stickier, so clots can form more easily to minimize bleeding from potential injuries. Immune system activity picks up. Your muscles—even tiny, hair-raising muscles beneath your skin—tighten, preparing you to spring into action.

Body systems not needed for the immediate emergency are suppressed. The stomach and intestines cease operations. Sexual arousal lessens. Repair and growth of body tissues slows.

Cannon believed the stress response was temporary. Minutes after the rush triggered by adrenaline, he thought, the body would wind down to its normal balance, a physical state known as homeostasis. That meant your lungs would slow their rate of breathing. Your blood pressure would drop as your heartbeat slowed and blood flowed in normal patterns again. Your intestines would start their work again, providing new fuel to replace the energy burned in the emergency. Bones would resume repairs or start growing again, and sex might appear more inviting.

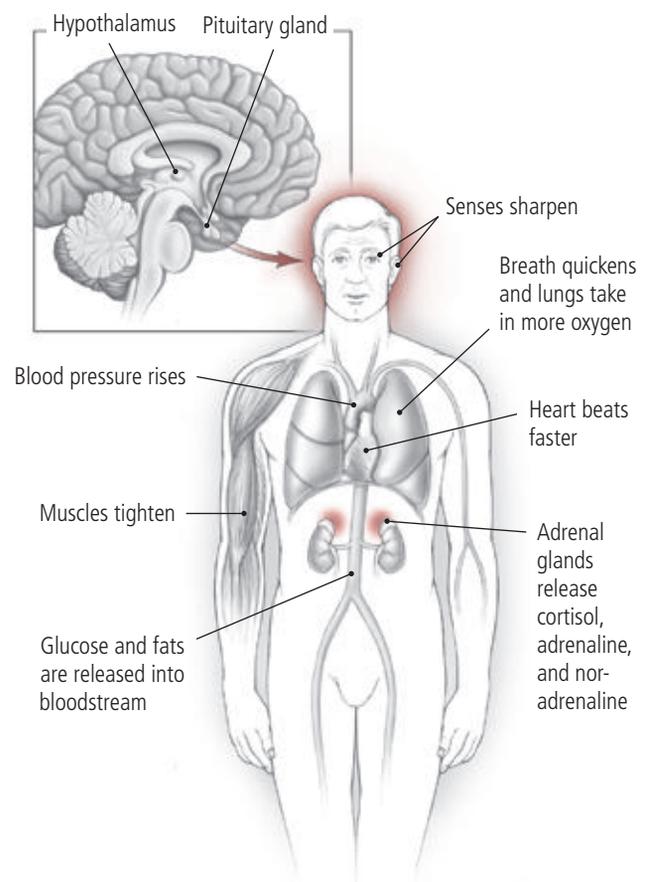
With the challenge that sparked the stress response behind you and the parasympathetic nervous system

exerting its calming influence, the day-to-day business of your body would resume. Later research showed, however, that Cannon was not completely correct (see “Stress and its toll on your body,” page 4).

## The positive side of stress

As many people have noted, the stress response can be enormously helpful. Surging adrenaline enables people to perform Herculean feats. Who can forget the firemen laden with lifesaving equipment who charged up flights of smoke-filled stairs in the World Trade

**Figure 1** The HPA axis and the stress response



The hypothalamus, pituitary gland, and adrenal glands make up the HPA axis, which plays a pivotal role in triggering the stress response. By releasing certain chemicals, such as adrenocorticotropic hormone (ACTH) and cortisol, the HPA axis rouses the body for action when it's faced with a stressor. As the illustration reveals, the effect of this release of hormones is widespread. Senses become sharper, muscles tighten, the heart beats faster, blood pressure rises, and breathing quickens. All of this prepares you to fight or flee in the face of danger.

Center after the terrorist attacks of Sept. 11, 2001? Or the ordinary citizens who carried injured and disabled people out of the towers?

Fight-or-flight responses are appropriate and essential in such overwhelming situations. When appropriately invoked, the stress response helps us rise to many challenges. These challenges may be external forces, such as a fire or an earthquake, or internal threats, such as your circulatory system teetering on the brink of a deadly collapse. The fight-or-flight response can prove beneficial under far less dangerous circumstances, too.

Physiologist Hans Selye, whose work helped shape modern stress theory, advanced the idea that physical and psychosocial stressors trigger the same physiological response. Selye explored the line between short-term stress that stimulates people to summon the resources to hurdle obstacles (“good” stress) and ongoing or overabundant stress, which wears down the ability to adapt and cope (“bad” stress, or distress). Two Harvard researchers, Robert M. Yerkes and John D. Dodson, likewise demonstrated that a jolt of stress isn’t necessarily bad. They noted that as stress or anxiety levels rose, so did performance and efficiency—up to a point (see Figure 2). At this turning point, further stress and anxiety led to significant declines in performance and ability.

Where that turning point falls seems to differ from person to person. For while the stress response is hard-wired into humans and other animals, the events and perceptions that set it off vary widely. What you perceive as a threatening situation, your neighbor may easily brush aside or even relish.

Scientists have tackled the question of why some

people appear less vulnerable to stress or even seem to thrive on regular doses of it. Some research has identified characteristics common to stress-hardy folks. Exercise and social support proved essential. So did control, challenge, and commitment. Stress-hardy people seem to feel a sense of control or the ability to influence events, embrace the challenge in situations others might find stressful, and describe themselves as committed to something meaningful. According to one study, people with these characteristics report fewer illnesses and are less likely to be absent from work.

## Stress and its toll on your body

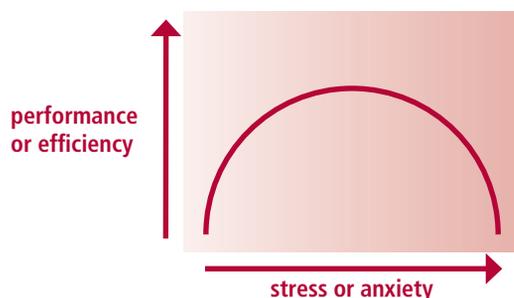
Intuitively, the stress response makes sense. It enables us to rise to occasions and events that reward heightened awareness and abilities. You see a bus rushing toward you, and the surge of adrenaline helps you sprint out of its path far faster than you normally move. The stress hormones that spilled into your bloodstream at the sight of the bus found the perfect physical outlet.

But experience tells us obvious dangers are not the only scenarios that elicit that response. Any situation you perceive as threatening or which requires you to adjust to a change may do the same. That’s where the trouble starts.

Your body does a poor job of distinguishing between life-threatening events and day-to-day stressful situations. Anger or anxiety triggered by less momentous sources of stress, such as financial fears or traffic jams, doesn’t find a quick physical release and tends to build up as the day rolls on. Adding to the turmoil is anticipation of potential problems, such as what you might experience in waiting for the results of a medical test. The physical and psychological symptoms of stress—a clenched jaw, shakiness, anxious feelings—compound this, creating a negative, self-perpetuating cycle.

When your body repeatedly experiences the stress response or when arousal following a terrible trauma is never fully switched off (see “Post-traumatic stress disorder,” page 5), worrisome health problems can occur. A prime example of this is high blood pressure, or hypertension, which is a major risk factor for heart

**Figure 2** Yerkes-Dodson law



As stress increases, performance initially rises and then declines.

disease. Another is suppression of the immune system, which increases susceptibility to colds and other common illnesses (see “Stress linked to health problems,” at right, and “How stress affects the body,” page 35).

It’s impossible to sidestep all sources of stress, nor would you want to. Our lives are full of physical and psychological challenges, which add zest to life and sometimes deliver satisfying rewards. But while you can’t easily erase certain sources of stress, you can learn to perceive and respond to them differently. The section “How to prevent and manage stress” on page 10 describes many tools to help you accomplish this.

### **Post-traumatic stress disorder (PTSD)**

Traumatic experiences often scar the psyche. Many of the people who fled or witnessed the destruction of the World Trade Center during the Sept. 11 attacks, as well as rescue workers who flocked to the site, suffered symptoms of post-traumatic stress disorder (PTSD). So too have military personnel who have been in combat, most recently in Iraq and Afghanistan. According to the National Center for Posttraumatic Stress Disorder, 12% to 20% of veterans of the Iraq war, 6% to 11% of veterans of the Afghanistan conflict, and as many as 30% of Vietnam veterans have experienced PTSD.

Other traumatic events—such as rape, physical assault, accidents, natural disasters, living in a war zone or otherwise violent locale, and losing a loved one suddenly—may also trigger PTSD. The risk of developing PTSD is higher among people with a family history of depression.

These are its key symptoms:

- recurrent flashbacks, dreams, or intrusive thoughts about a traumatic event
- withdrawal from people and certain situations
- avoidance of reminders of the event or difficulty recalling it
- difficulty sleeping
- being overly vigilant or easily startled.

Not everyone who survives a traumatic event develops PTSD. Even if your immediate response to a disaster is extreme, this is not a sign of an emotional disorder or mental illness. Reaching out to

## **Stress linked to health problems**

Stress may contribute to or exacerbate various health problems, including these:

- allergic skin reactions
- anxiety
- arthritis
- constipation
- cough
- depression
- diabetes
- dizziness
- headaches
- heart problems, such as angina, heart attack, and cardiac arrhythmia
- heartburn
- hypertension
- infectious diseases, such as colds or herpes
- infertility
- insomnia
- irritable bowel syndrome
- menopausal symptoms, such as hot flashes
- “morning sickness,” the nausea and vomiting of pregnancy
- nervousness
- pain of any sort, including backaches, headaches, abdominal pain, muscle pain, joint aches, postoperative pain, and chronic pain caused by many conditions
- postoperative swelling
- premenstrual syndrome
- side effects of AIDS
- side effects of cancer and cancer treatments
- slow wound healing
- trouble sleeping and resulting fatigue
- ulcers.

To the extent that stress causes these ailments, the relaxation response (a state of profound rest) and other stress-relief methods can be healing (see “How to prevent and manage stress,” page 10). More in-depth information about some of the medical effects of stress appears in “How stress affects the body” on page 35.

*Adapted primarily from The Wellness Book, Herbert Benson, M.D., and Eileen M. Stuart, R.N., M.S. (New York: Fireside, 1993).*

others and resuming normal life may provide solace. Relaxation therapies, physical activity, and expressing emotions while concentrating on the future may also prove useful.

However, you should seek help from a licensed mental health professional if symptoms affect you for more than a few weeks. Keep in mind, too, that sometimes symptoms don't occur until six months or more after the triggering event.

### **Anxiety and depression**

The buildup of stress often feeds or causes anxiety and depression, too. Adopting the strategies outlined in this report may help prevent these problems. Practicing stress-management techniques may also bring some relief from anxiety and symptoms of depression; however, it's important to seek advice from a licensed health professional. He or she can evaluate you and may recommend a combination of medications and counseling, as well as a mind/body program or other stress-management approaches.

Seek a professional opinion if your anxiety is severe enough to interfere with your daily life. Symptoms may include any of the following:

- extreme worry or fear much of the time, or repeated panicky feelings
- irrational feelings of fear, dread, or danger
- frequent physical symptoms—such as agitation, shakiness and trembling, nausea, hot and cold flashes, dizziness, shortness of breath, or frequent urination—in the absence of a rational threat
- recurrent distressing thoughts and uncontrollable repetitive behaviors intended to reduce the anxiety triggered by those thoughts.

Likewise, it's important to seek a professional opinion if you have the following symptoms of depression:

- prolonged feelings of sadness or irritability
- loss of interest in activities you once enjoyed
- sleeping or eating markedly more or less than usual
- feelings of guilt, worthlessness, or hopelessness
- feeling anxious and unable to sit still
- trouble concentrating and making decisions.

Recurrent thoughts of death or suicide are symptoms of depression that call for immediate professional attention. ♥

# Stress in your life

In the course of a lifetime, odds are good that you'll survive some very stressful events. You'll also face a gamut of far smaller day-to-day stressors. The list that appears later in this section will help you recognize the stress warning signs in your life. Once you're aware of how stress makes you feel and act, you can use the many different tools described here to help quell its effects.

## The major life event stress scale

Several decades ago, two psychiatrists at the University of Washington devised a scale for researchers that weighed the stress of major life events by asking 394 men and women to rank specific situations. The subjects were told that marriage equaled 50 units out of a possible 100, and they were asked to rate a list of other life events with that in mind. Their responses were then averaged.

### Major life event stress scale (out of a possible 100)

EVENT	SCORE	EVENT	SCORE
Spouse's death	100	Son or daughter leaving home	29
Divorce	73	Trouble with in-laws	29
Marriage separation	65	Outstanding personal achievement	28
Jail term	63	Spouse starts or stops working	26
Death of close relative	63	Start or stop school	26
Injury or illness	53	Change in living conditions	25
Marriage	50	Change in personal habits	24
Fired from job	47	Difficulty with boss	23
Marriage reconciliation	45	Shift in job hours or conditions	20
Retirement	45	Change in residence	20
Change in health of family member	44	Changing schools	20
Pregnancy	40	Change in recreation	19
Sexual difficulties	39	Change in church activities	19
New family member	39	Change in social activities	18
Business readjustment	39	Moderate debt	17
Change in finances	38	Shift in sleep habits	16
Death of close friend	37	Change in number of family get-togethers	15
Shift to different type of work	36	Shift in eating habits	15
Shift in number of arguments with spouse	35	Vacation	13
Moderate to high mortgage payments	31	Christmas	12
Foreclosure of mortgage or loan	30	Minor legal violations	11
Shift in work responsibilities	29		

*Adapted from The Relaxation Response, Herbert Benson, M.D., with Miriam Z. Klipper, updated and expanded edition (New York: Avon Books, 2000).*

In subsequent studies, Thomas Holmes and Richard Rahe, the scale's creators, noted that the death of a spouse—which ranks highest—appeared to have a serious impact on health. Surviving spouses were 10 times as likely to die within the subsequent year than others in their age group. Likewise, spouses who

divorced were 12 times as likely to get sick in the following year than were married people.

Many researchers have used the scale in studying how stress affects people. However, it has limitations. The study's age may limit its relevance today. In addition, it covers only major events, which repre-

## My stress warning signs

Being able to recognize when you're feeling stressed can help you quickly counteract the stress response. A good first step is to look over the list below and circle all the symptoms you recognize.

### Physical symptoms

- Tight neck and shoulders
- Back pain
- Sleep difficulties
- Tiredness or fatigue
- Racing heartbeat or palpitations
- Shakiness or tremors
- Sweating
- Ringing in ears
- Dizziness or fainting
- Choking sensation
- Difficulty swallowing
- Stomachache
- Indigestion
- Diarrhea or constipation
- Frequent, urgent need to urinate
- Loss of interest in sex
- Restlessness

### Behavioral symptoms

- Grinding of teeth
- Inability to complete tasks
- Overly critical attitude
- Bossiness
- Fidgeting
- Overuse of alcohol
- Emotional eating or overeating
- Fist clenching
- Changes in the amount of alcohol or food you consume
- Taking up smoking or smoking more than usual
- Increased desire to be with or withdraw from others
- Rumination (frequent talking or brooding about stressful situations)

### Emotional symptoms

- Crying
- Irritability
- Edginess
- Anger
- Feeling powerless to change things
- Nervousness
- Feeling anxious
- Quick temper
- Lack of meaning in life and pursuits
- Boredom
- Loneliness
- Unhappiness with no clear cause
- Depression

### Cognitive symptoms

- Continual worry
- Poor concentration
- Trouble remembering things
- Loss of sense of humor
- Indecisiveness
- Lack of creativity
- Trouble thinking clearly

### Other symptoms

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*Adapted primarily from The Wellness Book, Herbert Benson, M.D., and Eileen M. Stuart, R.N., M.S. (New York: Fireside, 1993).*

sent a small fraction of daily stressors. Simple everyday stressors—waiting in long lines, sitting in traffic, or coping with the demands of a job—can accumulate and endanger your physical and emotional health.

While primarily a tool for researchers, the scale can be helpful for those outside the field, too. You may find it useful to know that others have categorized an event that you may be facing—such as a change in your job—as particularly stressful. It's intriguing that many of the events on the scale aren't obviously negative. An outstanding personal achievement, a new baby, or a marriage may seem like cause for celebration. But many changes can be construed as uplifting or upsetting—or perhaps a bit of both. Truly, the perception of stress is specific to the person experiencing it.

The scale can also serve as a reminder. If you're coping with one or more of the stressors listed in the major life event stress scale, you may want to spend extra time practicing stress-management techniques and other self-help strategies.

## Recognizing the early signals

Most likely, you intuitively know how you react to stressful situations. Certainly big events and obvious distress are easy to spot. But smaller ripples may slip by your radar. Noting exactly how you're affected by stress will make you more aware of your personal stress warning signs early so you can derail unnecessary stress responses (see “My stress warning signs” at left).

## Unhealthy responses to stress

You probably have your own ways of dealing with stressful times. Some may be healthy, such as calling a friend, cooking a comforting dinner, or curling up in bed earlier than usual. Others may not be as benign. All too often, people self-medicate or turn to other unhealthy behaviors in an attempt to relieve pressure they feel. They may do so in a variety of ways. For example:

- watching endless hours of TV
- withdrawing from friends or partners or, conversely, jumping into a frenzied social life to avoid facing problems
- overeating or weight gain
- undereating or weight loss
- sleeping too much
- drinking too much alcohol
- lashing out at others in emotionally or physically violent outbursts
- taking up smoking or smoking more than usual
- taking prescription or over-the-counter drugs that promise some form of relief, such as sleeping pills, muscle relaxants, or anti-anxiety pills
- taking illegal or unsafe drugs.

Becoming aware of how you typically handle stress can help you make healthy choices. If you normally reach for a sugary snack, for example, you might instead call a friend. Choosing to connect rather than consume can relieve your stress. Studies suggest that emphasizing social ties can provide definite health benefits—with no calories! ♥

# How to prevent and manage stress

In the late 1970s, working in the same room at Harvard Medical School where Cannon had labored years before, a cardiologist named Herbert Benson launched landmark research into the damaging effects of stress and the body's potential for self-healing. In the years since, he and many other researchers have investigated the stress response and its antidotes—the relaxation response and other stress-relieving strategies.

Dr. Benson is the medical editor of this report and the president of the Benson-Henry Institute for Mind Body Medicine at Massachusetts General Hospital in Boston, which advises using a combination of approaches for stress management. Among them:

- learning various techniques that evoke the relaxation response, such as breath focus and body scanning
- nurturing yourself by setting aside time for socialization, relaxation, exercise, connecting with others, and pursuing activities that add joy to your life
- using cognitive restructuring, a method of helping you reframe negative thoughts in order to cope more effectively with a situation.

Such self-care is an essential ingredient for good health. The example of cardiovascular disease illustrates how it can make a difference. Currently, millions

## Relaxing the brain

A small study of five subjects used functional magnetic resonance imaging (fMRI) to map the parts of the brain that are active during meditation sessions that induce the relaxation response. Although global brain activity declined, signals increased in areas of the brain involved in attention as well as arousal and control of the autonomic nervous system. This suggests that meditation induces deep relaxation, yet sparks intense neural activity because of the vigilance required to keep the mind from wandering. By shining light on observable biological changes triggered by the relaxation response, this study helps bolster the concept that it is a distinct state and may also build support for its use in modern health care.

of Americans take medication to lower blood pressure and unhealthy cholesterol levels, two risk factors for heart disease. Surgical procedures, such as angioplasty and coronary artery bypass, can reopen blocked vessels or divert the flow of blood to healthier vessels. These two approaches—medication and medical procedures—are invaluable. Yet when used alone, they form only two legs of a sturdy three-legged stool that represents the best of modern health care. The third leg is self-care approaches of proven worth.

Research shows that regularly invoking the relaxation response leads to lasting declines in high blood pressure. Stress-management techniques that short-circuit the stress response, such as cognitive restructuring, can also reduce blood pressure. Good nutrition and regular exercise can improve levels of cholesterol, as well as blood pressure. And social support also has a strong protective effect on health. Over time, the combination of these self-care approaches may ward off serious consequences and reduce or possibly even eliminate the need for certain medications.

## Learning the relaxation response

The relaxation response—which is the opposite of the stress response—can be elicited at will to create a state of profound peace and rest. The relaxation response is a physiologic shift that puts the brakes on the runaway biological changes that first put us into overdrive. By regularly practicing techniques that evoke the relaxation response, you can help your body decrease the cumulative effects of stress.

A number of physiological changes occur during the relaxation response. When a person practices relaxation response techniques, for example, heartbeat and breathing slow down. The body uses less oxygen, and blood flows more easily throughout the body. Blood lactate levels, which some researchers believe are linked with anxiety attacks, decline markedly.

You can elicit the relaxation response in many different ways, including these:

- breath focus (see page 12)
- meditation (see “Meditation on the go,” page 22, and “Mindfulness meditation: The art of staying in the present,” page 15)
- visualization or guided imagery (see page 14)
- body scanning (see page 13)
- yoga, tai chi, or qi gong (see “Choosing exercise with relaxation in mind,” page 18)
- repetitive prayer (see page 25).

These are not the only techniques that can elicit the relaxation response. You may find that others are quite effective. What’s crucial is that the method you choose interrupts everyday thoughts by letting you focus on a word, phrase, prayer, or repetitive muscular activity. Once learned, these techniques can be practiced regularly almost anywhere. No special equipment or expert trainer is required, although many people find

mind/body programs and meditation or yoga classes helpful as they learn a new technique (see “Resources,” page 43).

### Creating a routine

Rather than choosing just one technique to elicit the relaxation response, you can benefit from sampling many. It will help you decide which methods work well for you. And if your favorite fails to engage you sometimes, you will have an alternative. In fact, many people get the best results from combining several techniques.

You may find it helpful to follow these tips when developing your routine:

- Find a quiet, peaceful place to sit or lie down.
- Focus. Choose a simple focus: your breath, a sound, or a word or phrase that you repeat aloud or silently.
- Learn to “let go” and relax. Accept any thoughts, feelings, or sensations that arise.

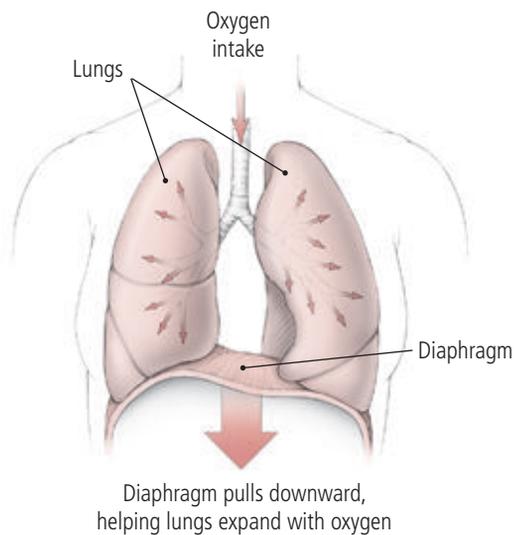
**Table 1** Which technique is right for you?

By regularly practicing techniques that elicit the relaxation response, you create a well of calm to dip into as the need arises. As this chart details, these techniques can be especially beneficial under certain circumstances, but may not be suitable under others.

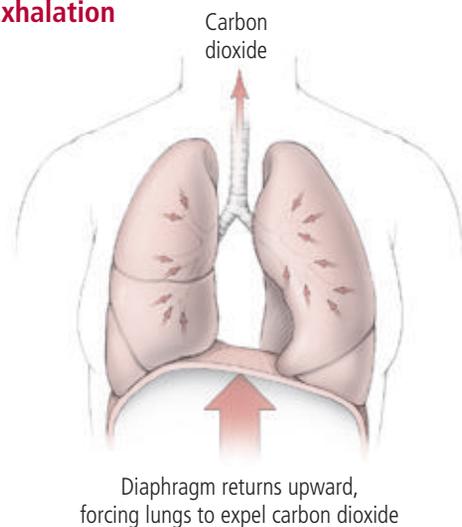
METHOD	WHAT IS IT?	ESPECIALLY BENEFICIAL	MAY NOT BE SUITABLE
<b>Breath focus</b>	Focusing on slow, deep breathing and gently disengaging the mind from distracting thoughts and sensations	If you have an eating disorder or tend to hold in your stomach; may help you focus on your body in healthier ways	If you have health problems that make breathing difficult, such as respiratory ailments, congestive heart failure, or panic attacks
<b>Mindfulness meditation</b>	Breathing deeply while staying in the moment by deliberately focusing on thoughts and sensations that arise during the meditation session	If racing thoughts make other forms of meditation difficult	If you find it too hard to commit the needed time
<b>Body scan</b>	Focusing on one part of the body or group of muscles at a time and mentally releasing any physical tension you feel there	For increasing your awareness of the mind/body connection	If you have had a recent surgery that affects body image
<b>Yoga, tai chi, and qi gong</b>	Three ancient arts that combine rhythmic breathing with a series of postures or flowing movements	<ul style="list-style-type: none"> <li>• At times when your mind is racing</li> <li>• Whenever you find it especially hard to settle down and focus</li> <li>• If you wish to enhance flexibility and balance</li> </ul>	If you are not normally active or have health problems or a painful or disabling condition; if so, speak with your doctor before starting any program of exercise
<b>Repetitive prayer</b>	Using a short prayer or phrase from a prayer to help enhance breath focus	If religion or spirituality are meaningful to you	If you are not religious
<b>Guided imagery</b>	Using pleasing mental images to help you relax and focus	When you want to reinforce a positive vision of yourself or a goal you wish to reach	<ul style="list-style-type: none"> <li>• If you have intrusive thoughts that make imagery difficult</li> <li>• If you have difficulty with visualizations</li> </ul>

## Figure 3 What happens as you breathe

### Inhalation



### Exhalation



Learning to breathe properly is the first step in practicing breath focus, a stress-management technique. As you breathe in, your diaphragm drops, giving your lungs the room they need to expand. If you are breathing properly, you should feel your lungs fill completely and your chest and belly rise. As you exhale, your diaphragm pushes up against your lungs, which helps to expel the carbon dioxide. If you're breathing deeply, your belly will fall as you exhale.

- Practice regularly—aim for once or twice a day. Sticking with a particular time of day can enhance the sense of ritual, which will enable you to practice more easily. Many people choose to elicit the relaxation response in the morning before breakfast since it can be hard to schedule time later in the day. Evi-

dence suggests the more regularly you practice these techniques, the better the outcome.

- A good goal is between 10 and 20 minutes daily.

## Breath focus

Breath focus is a simple yet powerful technique that can elicit the relaxation response for people of different backgrounds. Occasionally, however, health problems may make using this technique uncomfortable (see Table 1). The first step to practicing breath focus is to learn to breathe properly.

### The importance of your breath

Proper breathing goes by many names. You may have heard it called diaphragmatic breathing, abdominal breathing, or belly breathing. When you breathe deeply, the air coming in through your nose fully fills your lungs, and you will notice that your lower belly rises. The ability to breathe so deeply and powerfully is not limited to a select few. This skill is inborn but often lies dormant. Reawakening it allows you to tap one of your body's strongest self-healing mechanisms.

Why does breathing deeply seem unnatural to many of us? One reason may be that our culture often rewards us for stifling strong emotions. Girls and women are expected to rein in anger. Boys and men are exhorted not to cry. What happens when you hold back tears, stifle anger during a charged confrontation, tiptoe through a fearful situation, or try to keep pain at bay? Unconsciously, you hold your breath or breathe irregularly.

Body image affects breathing, too. A “washboard” stomach considered so attractive in our culture encourages men and women to constrict their stomach muscles. This adds to tension and anxiety, and gradually makes shallow “chest breathing” feel normal.

The act of breathing engages the diaphragm, a strong sheet of muscle that divides the chest from the abdomen. As you breathe in, the diaphragm drops downward, pulling your lungs with it and pressing against abdominal organs to make room for your lungs to expand as they fill with air. As you breathe out, the diaphragm presses back upward against your lungs, helping to expel carbon dioxide.

Shallow breathing hobbles the diaphragm's range of motion. The lowest portion of the lungs—which is where many small blood vessels instrumental in carrying oxygen to cells reside—never gets a full share of oxygenated air. That can make you feel short of breath and anxious.

Deep abdominal breathing encourages full oxygen exchange—that is, the beneficial trade of incoming oxygen for outgoing carbon dioxide. Not surprisingly, this type of breathing slows the heartbeat and can lower or stabilize blood pressure.

### Practicing breath focus

Diaphragmatic breathing is the foundation of breath focus, which is quite simple to do.

■ **First steps.** Find a comfortable, quiet place to sit or lie down. Start by observing your breath. First take a normal breath. Now try taking a slow, deep breath. The air coming in through your nose should move downward into your lower belly. Let your abdomen expand fully. Now breathe out through your mouth (or your nose, if that feels more natural). Alternate normal and deep breaths several times. Pay attention to how you feel when you inhale and exhale normally and when you breathe deeply. Shallow breathing often feels tense and constricted, while deep breathing produces relaxation.

Now practice diaphragmatic breathing for several minutes. Put one hand on your abdomen, just below your belly button. Feel your hand rise about an inch each time you inhale and fall about an inch each time you exhale. Your chest will rise slightly, too, in concert with your abdomen. Remember to relax your belly so that each inhalation expands it fully.

■ **Breath focus in practice.** Once you've taken the steps above, you can move on to regular practice of breath focus. As you sit comfortably with your eyes closed, blend your breathing with helpful imagery and a focus word or phrase that will help you relax. Imagine that the air you breathe in washes peace and calm into your body. As you breathe out, imagine that the air leaving your body carries tension and anxiety away with it. As you inhale, try saying this phrase to yourself: "Breathing in peace and calm." And as you exhale, say: "Breathing out tension and anxiety." When you first start, 10 minutes of breath focus is a reasonable

goal. Gradually add time until your sessions are about 15 to 20 minutes long.

## Body scan

A body scan is a relaxation technique that incorporates breath focus and visualization (see "Guided imagery," page 14). This technique helps you become more attuned to your body and aware of the connection between your mind and body.

Almost everyone carries unnecessary tension in his or her muscles. But where each of us feels it varies. One woman might have a tight neck and shoulders, while her husband feels an iron band digging into his forehead. A body scan can help you locate—and release—the tension in your body.

Performing a body scan is quite simple. Concentrate on one part of your body at a time. As you do, picture that muscle in your mind. Imagine it open, warm, and relaxed. Feel any tension melt away.

As a guide, use these steps, which are adapted from Dr. Herbert Benson and Aggie Casey's book *Mind Your Heart*:

- Sit or lie down. Begin with breath focus. Breathe deeply, allowing your stomach to rise as you inhale and fall as you exhale. Breathe this way for two minutes before you start.
- Concentrate on your right big toe. Imagine the atoms in your toe and focus on the space between each atom. Imagine your toe feeling open, warm, and relaxed.
- Now shift your focus to each of the other toes on your right foot, visualizing them one by one. Again, notice the sensations of your toes and envision them as open, warm, and relaxed.
- Slowly shift your focus to your foot, moving mentally from the ball of your foot to the arch, then the top of the foot.
- Now work your way up your leg, turning your attention to your ankle, calf, knee, thigh, and hip. Take your time, slowly working through each area. For each body part, envision the atoms and the space between those atoms. Picture each muscle feeling open, warm, and relaxed.

- Allow your right leg to relax, sinking into the support of the floor.
- Now repeat these steps, focusing on your left foot and leg.
- Next, become aware of your back. Does it feel tight or tense? Pay attention to each vertebra and the space that surrounds it. Let each vertebra feel light and spacious. Slowly work your way up your back, relaxing each muscle there.
- Gradually, move on to your abdomen and chest. Picture your organs and the space between them. Allow your belly to feel light and open.
- Become aware of your right thumb, and then your remaining fingers. Envision each finger one by one, then slowly work your way through your hand and arm: relax your palm, wrist, forearm, elbow, upper arm, and shoulder.
- Feel your right arm relax and feel warm, spacious, and light.
- Do the same thing with your left hand and arm.
- Think about your neck and jaw. Yawn. Allow each part of your face to relax, working through your jaw, eyes, and forehead. Shift your attention to the top and back of your head.
- Let your whole body sink into your chair or bed. Does it feel light and relaxed? Focus on your breath. Imagine yourself breathing in calm and peace. As you breathe out, imagine any remaining tension being expelled from your body.
- If any part of your body is still tense, focus your breathing in that area, releasing tension from that spot as you exhale.
- Sit or lie quietly for a few minutes, noting how light and spacious your body feels. Then open your eyes slowly. Take a moment to stretch, if you'd like.

## Guided imagery

Guided imagery, or visualization, that mentally conjures soothing scenes can be a powerful way of evoking the relaxation response. The images you choose—whether scenes, places, or experiences—enhance the sensation of inner calm. They break the chain of

everyday thought. While imagery is often touted as beneficial for people with cancer or other illnesses, not enough studies support some of the health-enhancing claims. It has, however, been proved to lessen pain and side effects of various drugs, including chemotherapy.

Lush descriptions of sandy beaches, bubbling streams, and fields of flowers are often verbalized by a therapist or recorded on a CD to help people visualize calming scenes. Just be sure that the image is soothing to you, because the exercise won't be effective otherwise. For example, a field of flowers could have negative associations if you suffer from hay fever.

If you aren't using a CD, conjure up your own safe or special haven and imagine yourself there. What do you smell—pine needles, rain steaming off hot pavement, vanilla in a kitchen? What do you hear? Are clouds or birds passing by? Drink in the surrounding colors. Concentrate on sensory pleasures: a cool breeze on your cheek, gravel crunching underfoot, or the scent of flowering trees. Make a voice recording describing all of this if you think that would help you find this spot again.

Before you start your guided imagery session, find a quiet place to sit. Arrange your body comfortably. Clear your mind while taking deep, even breaths for several minutes, and then conjure up the images you find relaxing. Accept intrusive thoughts passively by observing them. Then return to the web woven by your senses. Practice for 10 to 20 minutes.

## Proper nutrition

The computer-age aphorism “garbage in, garbage out” applies to far more than software development. The food choices you make can feed your stress or ease it by truly nourishing your body. What you eat plays a big role in your risk of developing many illnesses, including hypertension, heart disease, diabetes, and cancer, which in turn affect your overall stress level. Obesity due to overeating is linked with many ailments, too. It's also a source of stress for millions of Americans who are continually reminded of their failure to achieve the slim look idolized in this culture.

Undernourishment can be a problem, too, especially among older people. According to research

## ► Mindfulness meditation: The art of staying in the present

In our busy world, multitasking is a way of life. We fold the laundry while keeping one eye on the kids and another on the television. We chat on our cell phones while commuting to work. We pay the bills, munch on a snack, and listen to a spouse complain about a work project, all at the same time. But in the rush to accomplish necessary tasks, we often lose our connection with the present moment. We sprint through daily activities without being truly attentive to what we're doing and how we're feeling.

In contrast, mindfulness, which has its roots in Buddhist practices, teaches us to live each moment as it unfolds. It is the practice of focusing attention on what is happening in the present and accepting it without judgment. And that—many physicians and therapists believe—can be a powerful therapeutic tool.

Mindfulness is often learned through meditation, a method of regulating your attention by focusing on your breathing, a phrase, or an image. Over the last few decades, scientists have discovered the benefits of using mindfulness meditation techniques to help relieve stress, treat heart disease, and alleviate conditions such as high blood pressure, chronic pain, sleep problems, and gastrointestinal difficulties.

In recent years, therapists—particularly cognitive behavioral therapists—have turned to mindfulness techniques to treat mood problems. Studies have found that mindfulness meditation can help prevent relapse in people who have had several episodes of depression. There is evidence that meditation has distinct effects on the brain. In one study, researchers measured brain electrical activity before, immediately after, and four months after a two-month course in mindfulness meditation. They found persistent increased activity on the left side of the prefrontal cortex, which is associated with joyful and serene emotions.

Mindfulness offers other benefits. One of the goals is to enhance your appreciation of simple everyday experiences. By learning to focus on the here and now, many people who practice mindfulness find that they are less likely to get caught up in worries about the future or regrets over the past.

Mindfulness meditation teaches you to focus on distracting thoughts and sensations that occur. Some experts in the field—such as Jon Kabat-Zinn, author of *Full Catastrophe Living* and founder and former director of the Stress Reduction Clinic at the University of Massachusetts Medical Center—believe that facing what arises and opening yourself up to it is the first step toward personal transformation and growth.



### Practicing mindfulness meditation

Here's how to get started with mindfulness meditation. Sit on a straight-backed chair or cross-legged on the floor. Focus on an aspect of your breathing, such as the sensations of air flowing into your nostrils and out of your mouth, or your belly rising and falling as you inhale and exhale. Once you've narrowed your concentration in this way, begin to widen your focus. Become aware of sounds, sensations, and ideas.

Embrace and consider each without judgment. If your mind starts to race, return your focus to your breathing. Then expand your awareness again. Kabat-Zinn recommends committing to 45 minutes of meditation at least six days a week without expectations, but if time is a factor you can try a 20-minute session daily.

A less formal approach to mindfulness can also encourage you to stay in the present and truly participate in your life. You can choose any task or moment to practice mindfulness. Whether you are eating, showering, walking, touching a partner, or playing with a child or grandchild, attending to these three points will help:

1. Start with breath focus and return to it periodically, staying aware of each inhalation and exhalation.
2. Proceed with the task or pleasure at hand slowly and with full deliberation.
3. Engage your senses fully so that you savor every sensation.

Peeling and eating an orange offers an excellent example. For a few moments, just concentrate on your breath moving in and out of your nostrils. Look at the orange, turning it over in your hands. Run your fingertips over its bumpy texture and absorb its vibrant color and light citrus scent. As you peel it, engage your senses fully. Note the slight spray as your fingers dig into and peel back the hardened skin and soft white pith. How does the orange smell and feel now? Are you salivating? When you put a slice of it into your mouth and break through the thin membrane into its juicy center, what sensations do you feel?

Try not to hurry through one mouthful of orange to get to the next. Slow down and stay in the moment. Before you swallow each portion of the orange, be aware of the rising desire to do so. Then note how it feels when you swallow. Throughout the experience, remain fully aware. How much are you eating? How do you feel physically and psychologically before, during, and after eating?

done for the Baltimore Longitudinal Study of Aging, most older men and women in America have nutritional deficits in calcium, zinc, iron, magnesium, folic acid, and vitamins B<sub>6</sub>, B<sub>12</sub>, and D. These nutrients affect your energy, bones, heart, mental acuity, and mood. Such nutritional deficits have implications for stress, too.

Food symbolizes far more than sustenance for many people. Some people eat to relieve anxiety or to fill an emotional void. Conversely, eating can be fraught with anxiety for those with eating disorders.

### Tips for achieving nutritional balance

Supplying your body with good food in the right amounts goes a long way toward helping maintain your energy level.

**At breakfast:** Combine fruits with whole grains and lean proteins. Good options include a glass of skim milk and a serving of oatmeal topped with half a cup of fresh blueberries, or a couple of pieces of whole-grain toast with a piece of fresh fruit and skim milk. Or choose low-fat plain yogurt with berries and a serving of whole-grain cereal.

**For lunch and dinner:** Use your plate as a visual guide. Fill half of it with raw or cooked vegetables. Whole grains should account for one-quarter, and lean protein such as chicken, turkey, fish, beans, lentils, or tofu should make up the other quarter.

**When snacking:** Dole out an appropriate-size serving and eat that, instead of snacking directly out of the box. Also, avoid surrounding yourself with temptation. Instead of stocking the fridge with cartons of ice cream, fill it with fresh fruits, veggies, and healthful treats. Then, at the times when you're really craving ice cream, go out for a scoop.

#### In general:

- Eat from smaller plates; large plates encourage taking bigger helpings.
- Avoid seconds; if you're still hungry at the end of the meal, choose a piece of fruit instead.
- Start your meal with a hot beverage such as tea, soup, or broth. Hot drinks are more filling than cold ones and can help you avoid overeating.
- Before snacking, take a deep breath and ask yourself if you really are hungry or whether anxiety, boredom, or loneliness is driving your desire to eat. If you are feeling stressed, find another means to relax yourself, like going for a walk or calling a friend. Also, try drinking a glass of water to see if that satisfies you.

### Making changes

After weighing data gathered from thousands of men and women enrolled in well-designed, long-term studies, Harvard nutrition experts developed the Healthy Eating Pyramid (see Figure 4). The recommendations in the pyramid are explained in greater detail in the book *Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating*, by Dr. Walter Willett, chairman of the department of nutrition at the Harvard School of Public Health and professor of medicine at Harvard Medical School.

The diet suggested here may bear little resemblance to what you normally eat. Rather than create more stress about how well or poorly you eat, consider a few simple changes to strengthen your current diet. Could you increase your daily servings of vegetables and fruit? Could you expand your color palette, choosing a range of deep-hued vegetables and fruits, which tend to have more antioxidants and important nutrients? Could you replace some unhealthy fats (such as those found in meat, cheese, and most commercial baked goods) with healthier sources (such as olive or canola oil and fats found in nuts and cold-water fish like salmon)? Could you choose whole grains like brown rice, barley, whole-wheat bread and pasta, quinoa, and whole-wheat couscous more often than refined grains like white rice or white flour? These simple steps can have a real impact on your health.

### Eat mindfully

Food offers comfort and pleasure as well as nourishment. Gulping down fast food while changing lanes on the freeway, however, offers none of these benefits. We're a culture in a rush, and that influences how we eat. Fast-food meals have replaced family mealtimes, and the practice of eating while driving has become such a cultural phenomenon that the term "dashboard dining" has been coined to describe it. But the problem with eating fast and furiously is that you may end up eating more than you intend—not to mention the indigestion that is almost sure to follow. Taking the time to eat mindfully can renew your enjoyment of food. It will also help you regulate your food consumption, since it takes 20 minutes from the time you start eating for the "fullness signal" in the brain to kick

in. That means that when you rush through a meal, you may well be finished eating before you even begin feeling satisfied.

Instead, try to take the time to savor each bite. To practice mindful eating, start by setting a place for yourself and sit down. Close your eyes for several seconds, and inhale and exhale deeply to help yourself focus. Bring your full attention to the moment. Look at your food and breathe in its aromas before you taste it. Chew slowly so you can delight in textures and flavors. Try not to rush through one mouthful to get to the next. Bringing all your senses into play can sharpen your taste for fresher, healthier foods and help break the cycle of stress-related eating.

Think of how you feel before you begin to eat, while you're eating, and afterward. Are you feeling physical signs of hunger, or is it simply "time" for dinner? Are you eating to quell stress? As you become more aware of your feelings, you may find other stress-control techniques just as satisfying as eating.

## Exercise

Nearly every form of exercise offers a host of health-enhancing benefits if performed regularly at moderate intensity. Exercise improves cholesterol levels, lowers blood pressure, keeps bones strong and healthy, and enhances the immune system. It also boosts metabolism and mood, and helps you maintain your vitality and independence in later years. Research suggests that even so-called lifestyle activities, such as gardening or playing active games with children, offer many of these benefits.

You can use exercise to stifle the buildup of stress in several ways. If you exercise shortly after the stress response is engaged—let's say by sprinting away from an oncoming bus—you burn off stress hormones just as nature intended. Just about any form of motion helps relieve pent-up muscle tension. And certain activities, such as yoga, tai chi, or qi gong (see "Choosing exercise with relaxation in mind," page 18), and repetitive exercises, such as walking, running, or rowing, elicit the relaxation response, too. Regularly engaging in these kinds of activities can help you ward off everyday stress.

To boost the stress-relief rewards, make an effort

## Figure 4 The Healthy Eating Pyramid



Adapted from *Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating* by Walter Willett, M.D. (Simon & Schuster, 2005).

to shift your attention to become aware of yourself—what and how you're feeling—and your surroundings during exercise. This should leave you feeling calmer and more centered. This approach can also be incorporated into resistance training. As you raise and lower the weights, coordinate your breathing with your movements, and focus your attention on the sensations in your body as you perform each exercise.

A few words of care are in order:

- If you aren't normally active, or if you have health problems or a painful or disabling condition, speak with your doctor before beginning any exercise program.
- When you do exercise, listen to your body. Perform only movements that feel comfortable to you. As you grow stronger or more limber, gradually expand your range.
- Try to integrate deep, calm breathing into your routine. You may find it easiest to first familiarize yourself with the movements of the exercises you select and then combine them with deep breathing.
- If you wish to try yoga, tai chi, or qi gong, join a class with an experienced instructor who can help you learn the movements correctly and adapt the program to your needs.

## Choosing exercise with relaxation in mind

Some exercises, such as the following, are especially effective at promoting relaxation. Try working some or all of these activities into your routine.

■ **Yoga.** Based on Indian philosophy, yoga is an excellent way to develop body awareness and elicit the relaxation response. The many different types of yoga share certain basic elements: pranayamas (rhythmic breathing), meditation, and asanas (stretching postures). Like tai chi and qi gong, yoga increases flexibility and coordination, releases muscle tension, and enhances tranquility.

A 2005 study of lifestyle and health habits revealed another potential benefit for yoga practitioners. Middle-aged adults of average weight who practiced yoga for four or more years gained 3 fewer pounds over a 10-year period than those who did not do yoga. Overweight individuals who regularly practiced yoga over the same period actually lost an average of 5 pounds. Since yoga is generally not vigorous enough for this

### Putting stress relief in someone else's hands: The benefits of massage

A massage at the hands of a skilled practitioner can be rejuvenating. Research shows massage has a physiological impact, too. A 2005 review of research studies involving massage therapy showed that massage consistently lowered levels of cortisol while increasing activity of pleasure-related brain chemicals in patients with a broad range of physical and psychological conditions. Massage also lowers blood pressure and heart rate and may enhance certain measures of immune function.

A 2005 study showed that women with breast cancer who participated in massage therapy three times a week for five weeks showed more immune system activity and reported less depression, anxiety, and fatigue than the women who didn't receive massages regularly. Some studies have found that massage is also beneficial in boosting the immune systems of people with HIV.

Whether it's for therapeutic reasons or purely for pleasure, massage offers the comforts of a warm touch and release from muscle tension. Experienced practitioners can be found through professional organizations, such as the American Massage Therapy Association ([www.amtamassage.org](http://www.amtamassage.org) or toll-free at 877-905-2700) and the National Certification Board for Therapeutic Massage and Bodywork ([www.ncbtmb.com](http://www.ncbtmb.com) or toll-free at 800-296-0664).

effect to be attributed to extra calorie expenditure, the study authors offered two other possible explanations. One hypothesis is that yoga affects weight control on a cellular level, because it lowers concentrations of the stress hormone cortisol in the body. High levels of cortisol are implicated in the thickening waistline that often accompanies middle age. Another theory is that the mindfulness cultivated by the practice of yoga helps create a heightened awareness of one's body—a state of mind that translates into healthier eating and exercise habits.

■ **Tai chi.** This series of slow, fluid, circular motions originated as a martial art. Tai chi especially benefits older people. By enhancing balance and muscle strength and improving aerobic capacity, it helps prevent falls that can lead to fractures and girds against gradual decline in physical function. One randomized trial published in the *Journal of the American Geriatrics Society* concluded that tai chi nearly halved the risk of falling in men and women ages 70 or older. Its low-intensity movements produce declines in blood pressure similar to those achieved with moderate-intensity aerobics, according to another randomized study of sedentary adults ages 60 or older. Some doctors recommend tai chi for people with osteoarthritis as a way to reduce joint swelling and improve range of motion.

■ **Qi gong.** This ancient Chinese art melds breathing, meditation, gentle exercise, and flowing movements. Qi, or chi, is the Chinese word for life energy believed to course through the body. Qi gong aims to unblock and properly balance the flow of qi. When practiced regularly, it can lower your blood pressure, pulse, and demand for oxygen. These effects are all components of the relaxation response. Qi gong may also enhance balance and flexibility.

■ **Rhythmic, repetitive activities.** Rhythmic exercises, such as walking, jogging, swimming, or bicycling, can be calming and relaxing. Once you get under way, become aware of how your breathing complements the activity. Breathe rhythmically, repeating the focus word, phrase, or prayer you've chosen. Remember to adopt a passive attitude. When disruptive thoughts intrude, gently turn your mind away from them and focus on moving and breathing.

■ **A mindful walk.** Taking a mindful walk is a good example of exercising with relaxation in mind. As you move and breathe rhythmically, be aware of the sensations of your body. How does it feel as your breath flows in through your nostrils and out through your mouth? Gradually expand your awareness to the sights and smells around you. Notice the freshly mown grass, flowers, trees, fallen leaves, dappled sun, or gray clouds. How does the outside air feel against your body? How does the surface beneath your feet feel and sound? What thoughts are moving through your head? A slow, mindful walk helps center and relax you. Alternatively, a brisker pace that pushes your limits can be calming and energizing in equal parts. In this case, place more emphasis on the sensations of your body, such as your quickened breathing and heartbeat and the way your muscles respond as you tax them.

## Social support

Just as a ship is protected by the rubber bumpers that separate it from a hard wooden dock, so, too, do people benefit when social buffers soften the inevitable bumps and bruises of life. Studies show that social ties—at least those that represent positive relationships—significantly protect health and well-being.

In Sweden, researchers following more than 17,000 men and women for six years found that the group that reported the most isolation and loneliness had almost four times the risk of an early death as those with good social networks. California researchers who tracked roughly 7,000 Alameda County residents for nine years found that a lack of strong community and social bonds multiplied the likelihood of dying by nearly two to three times.

Confidants, friends, acquaintances, co-workers, relatives, and spouses or companions weave a life-enhancing social net. Their support may involve outright assistance or may be largely emotional. Studies show that people who have greater social support fare better on measures of immune function when faced with stressors as diverse as caregiving, surgery, exams, and job strain. For example, women with breast cancer who felt they had high-quality emotional support from an intimate relationship, social support from a

doctor, and nourishment from other connections had more natural killer cells—capable of destroying virus-laden cells and certain tumor cells—than those who lacked these advantages.

Not surprisingly, the quality of relationships counts. Research suggests that negative ones—such as an embattled marriage or a draining caretaking arrangement—can be more harmful than helpful.

### Strengthening your social bonds

Given the pleasures and benefits of social ties, why not grasp opportunities to expand your social circle and deepen the ties you've already made? Here are some ways to do just that:

- If you normally wait for others to reach out, pick up the phone and propose a date.
- Explore some of the many volunteer opportunities available, from wielding tools to spruce up affordable housing to mentoring a child or businessperson. Check with VolunteerMatch ([www.volunteermatch.org](http://www.volunteermatch.org)) or Senior Corps ([www.seniorcorps.org](http://www.seniorcorps.org)), or call your local chapter of the United Way for opportunities that fit your talents and interests.
- Harness the warmer side of technology. E-mail and telephones extend your reach around the world. Libraries and senior centers may offer free online time and may even help you set up a free e-mail account.
- Find like-minded people through intriguing classes and organizations.
- If it's hard to get to religious services, ask fellow congregants to escort you. If a significant illness keeps you away, find out if your spiritual leader makes home visits.
- Social support is a two-way street. Offer assistance to friends, family, and neighbors, and accept it when it's offered to you.
- Share a confidence. Doing so can turn a friendly relationship into an even deeper one.
- Consider adopting a pet. Research shows that pets can have beneficial effects on your physical and emotional health.
- If depression, low self-esteem, or social phobias affect your ability to make connections, seek help.

Start by talking with your doctor. Many people have been aided by therapy, medications, or both.

## Nurturing yourself

Learning to nurture yourself is another key task in managing stress. While you may know a great deal about nurturing others, satisfying your own needs may not be second nature.

It's common wisdom, for example, that women spend a larger percentage of their waking hours nurturing others than men do. Whether or not women work outside the home, studies suggest that they spend more time than men do tending house and loved ones. If you're a woman, odds are good that you provide the emotional glue that holds relationships and families together. You buy the birthday cards, pick up the phone to offer help when someone is sick, and do much of the work or coordination of services involved in caring for elderly parents, children, grandchildren, and spouses in need of assistance. Our culture expects you to be self-sacrificing. Your needs may take last place; putting yourself first is cast as selfishness.

For men, our society places great emphasis on getting ahead. That can encourage a single-minded focus on career to the detriment of other activities. In this way, men are discouraged from indulging their nurturing side.

Just as women are pressed from the get-go to give to others, men are pushed toward the receiving end. That creates imbalances and potential sources of distress for both sexes. If you're a woman, you may not feel comfortable taking time to refresh yourself. If you're a man, you may not have much practice creating your own nurturing rituals and, like your female counterpart, you may feel uneasy doing so. Clearly, both women and men can benefit from learning to focus on themselves in healthy, rejuvenating ways.

### Learning to care for yourself

The art of nurturing yourself is not a single technique. Rather, it's an overarching concept for your life, says Harvard psychologist Alice D. Domar in her book *Self-Nurture*. The spark you gain from nurturing your imagination, career, relationships, sex life,

or spiritual side amplifies the healing effects of other stress-relief techniques. The many, varied options for self-nurture include:

- journal writing
- cognitive restructuring
- relaxation exercises
- affirmations and prayer
- social support
- creative, productive, and leisure activities.

Imagine these techniques and self-nurturing acts as dry seeds for a garden. Lush growth rewards those who do more than scratch the earth, toss in a few seeds, and step back to see what comes up. Dig deep. Water frequently. Remove choking weeds from the plot when necessary. Combining the richness of your past experiences, a willingness to expand your current boundaries, and a desire to fill your life with courage, love, and joy can make a great deal of difference in what you reap.

### Creativity, productivity, and leisure

The nerve-jangling pressure of lengthy daily "to do" lists can leach away energy. The thought of adding more items to the list may fill you with more dismay than delight, even if the addition is relaxation, creativity, or time with a loved one. Yet when you refresh yourself in ways that are meaningful to you, you add to your stock of energy and joy.

What does "creativity" mean to you? Writing a short story? Sculpting clay? Designing a retreat? Pulling out a paint box? Dancing around the room? Building a deck? Cooking up a feast? Landscaping a garden?

If you have a dream you've never explored, find small and big ways to follow through. Sing in the shower, take lessons from a pro, or try out a song in front of friends. If you have no idea where to turn, sign up for a class you think you might enjoy. Give yourself the opportunity to try a variety of options. Don't give up if the first one fails to captivate you or if the results of your effort don't meet your expectations. Discover what creative work you love, and do it.

Productive work forges links between you and the world and invests life with meaning. It matters little

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# Your portable guide to stress relief

**T**he best-written book on stress control is no help to you if you can't find time to read it. If you have only a short while to spare, dip into the stress-busting suggestions described in this section. Whether you have one minute or half an hour, you'll find ways to ease your day.

## 1 Take the sting out of 10 common stressors

Sometimes just thinking about embarking on a program of stress control can be stressful. Rather than freeze in your tracks, start small and bask in the glow of your successes. Give yourself a week to focus on practical solutions that could help you cope with just one stumbling block or source of stress in your life. Pick a problem, and see if these suggestions work for you.

**1. Frequently late?** Apply time-management principles. Consider your priorities (be sure to include time for yourself) and delegate or discard unnecessary tasks. Map out your day, segment by segment, setting aside time for different tasks, such as writing or phone calls. If you are overly optimistic about travel time, consistently give yourself an extra 15

minutes or more to get to your destinations. If lateness stems from dragging your heels, consider the underlying issue. Are you anxious about what will happen after you get to work or to a social event, for example? Or maybe you're trying to jam too many tasks into too little time.

**2. Often angry or irritated?** Consider the weight of cognitive distortions. Are you magnifying a problem, leaping to conclusions, or applying emotional reasoning? Take the time to stop, breathe, reflect, and choose (see pages 24 and 28).

**3. Unsure of your ability to do something?** Don't try to go it alone. If the problem is work, talk to a co-worker or supportive boss. Ask a knowledgeable friend or call

the local library or an organization that can supply the information you need. Write down other ways that you might get the answers or skills you need. Turn to tapes, books, or classes, for example, if you need a little tutoring. This works equally well when you're learning relaxation response techniques, too.

**4. Overextended?** Clear the deck of at least one time-consuming household task. Hire a housecleaning service, shop for groceries through the Internet, convene a family meeting to consider who can take on certain jobs, or barter with or pay teens for work around the house and yard. Consider what is truly essential and important to you and what might take a backseat right now.

**5. Not enough time for stress relief?**

Try mini-relaxations. Or make a commitment to yourself to pare down your schedule for just one week so you can practice the relaxation response every day. Slowing down to pay attention to just one task or pleasure at hand is an excellent method of stress relief.

**6. Feeling unbearably tense?** Try massage, a hot bath, mini-relaxations, a body scan, or a mindful walk. Practically any exercise—a brisk walk, a quick run, a sprint up and down the stairs—will help, too. Done regularly, exercise wards off tension, as do relaxation response techniques.

**7. Frequently feel pessimistic?** Remind yourself of the value of learned optimism: a more joyful life and, quite possibly, better health. Practice deflating cognitive distortions. Rent funny movies and read amusing books. Create a mental list of reasons you have to feel grateful. If the list seems too short, consider

beefing up your social network and adding creative, productive, and leisure pursuits to your life.

**8. Upset by conflicts with others?**

State your needs or distress directly, avoiding “you always” or “you never” zingers. Say, “I feel \_\_\_\_\_ when you \_\_\_\_\_.” “I would really appreciate it if you could \_\_\_\_\_.” “I need some help setting priorities. What needs to be done first and what should I tackle later?” If conflicts are a significant source of distress for you, consider taking a class on assertiveness training.

**9. Worn-out or burned-out?**

Focus on self-nurturing techniques. Carve out time to practice the relaxation response or at least indulge in mini-relaxations. Care for your body by eating good, healthy food and for your heart by seeking out others. Give thought to creative, productive, and leisure activities. Consider your priorities in life: Is it worth feeling this way, or is another

path open to you? If you want help, consider what kind would be best. Do you want the job taken off your hands? Do you want to do it at a later date? Do you need someone with particular expertise to assist you?

**10. Feeling lonely?** Connect with others. Even little connections—a brief conversation in line at the grocery store, an exchange about local goings-on with a neighbor, a question for a colleague—can help melt the ice within you. It may embolden you, too, to seek more opportunities to connect. Be a volunteer. Attend religious or community functions. Suggest coffee with an acquaintance. Call a friend or relative you miss. Take an interesting class. If a social phobia, low self-esteem, or depression is dampening your desire to reach out, seek help. The world is a kinder, more wondrous place when you share its pleasures and burdens.

## 2 Meditation on the go

Meditation can evoke the relaxation response, and appears to have health benefits as well (see page 15). It's also simple to perform. Here's how to get started:

- Choose a mental device to help you focus. Silently repeat a word, sound, prayer, or phrase (such as “one,” “peace,” “Om,” or “breathing in calm”). You may close your eyes if you like or focus your gaze on an object.
- Adopt a passive attitude. Disregard distracting thoughts or concerns about how well you're doing. Any time your attention drifts, simply say, “Oh, well” to yourself and return to silently repeating your focus word or phrase.
- Now slowly relax your muscles, moving your attention gradually from your face to your feet. Breathe easily and naturally while using your focal device for 10 to 20 minutes. After you finish, sit quietly for a minute or so with your eyes closed. Then open your eyes, and wait another minute before standing up.
- Try to practice this meditation daily for 10 to 20 minutes, preferably at a specific time each day.

### 3 Try a mini-relaxation

Mini-relaxations can help allay fear and reduce pain while you sit in the dentist's chair. They're equally helpful in thwarting stress before an important meeting, while stuck in traffic, or when faced with people or situations that annoy you. Here are a few quick relaxation techniques to try.

#### When you've got 1 minute

Place your hand just beneath your navel so you can feel the gentle rise and fall of your belly as you breathe. Breathe in slowly. Pause for a count of three. Breathe out. Pause for a count of three. Continue to breathe deeply for one minute, pausing for a count of three after each inhalation and exhalation.

Or alternatively, while sitting comfortably, take a few slow deep breaths and quietly repeat to yourself "I am" as you breathe in and "at peace" as you breathe out. Repeat slowly two or three times. Then feel your entire body relax into the support of the chair.

#### When you've got 2 minutes

Count down slowly from 10 to zero. With each number, take one complete breath, inhaling and exhaling. For example, breathe in deeply saying "10" to yourself. Breathe out slowly. On your next breath, say "nine," and so on. If you feel lightheaded, count down more slowly to space your breaths further apart. When you reach zero,

you should feel more relaxed. If not, go through the exercise again.

#### When you've got 3 minutes

While sitting down, take a break from whatever you're doing and check your body for tension. Relax your facial muscles and allow your jaw to fall open slightly. Let your shoulders drop. Let your arms fall to your sides. Allow your hands to loosen so that there are spaces between your fingers. Uncross your legs or ankles. Feel your thighs sink into your chair, letting your legs fall comfortably apart. Feel your shins and calves become heavier and your feet grow roots into the floor. Now breathe in slowly and breathe out slowly.

#### When you've got 5 minutes

Try self-massage. A combination of strokes works well to relieve muscle tension. Try gentle chops with the edge of your hands or tapping with fingers or cupped palms. Put fingertip pressure on muscle knots. Knead across muscles, and try long, light, gliding strokes. You can apply these strokes to any part of the body that falls easily within your reach. For a short session like this, try focusing on your neck and head.

- Start by kneading the muscles at the back of your neck and shoulders. Make a loose fist and drum swiftly up and down the sides and back of your neck. Next, use your thumbs to work

tiny circles around the base of your skull. Slowly massage the rest of your scalp with your fingertips. Then tap your fingers against your scalp, moving from the front to the back and then over the sides.

- Now massage your face. Make a series of tiny circles with your thumbs or fingertips. Pay particular attention to your temples, forehead, and jaw muscles. Use your middle fingers to massage the bridge of your nose and work outward over your eyebrows to your temples.
- Finally, close your eyes. Cup your hands loosely over your face and inhale and exhale easily for a short while.

#### When you've got 10 minutes

Try imagery. Start by sitting comfortably in a quiet room. Breathe deeply for a few minutes. Now picture yourself in a place that conjures up good memories. What do you smell—the heavy scent of roses on a hot day, crisp fall air, the wholesome smell of baking bread? What do you hear? Drink in the colors and shapes that surround you. Focus on sensory pleasures: the swoosh of a gentle wind; soft, cool grass tickling your feet; the salty smell and rhythmic beat of the ocean. Passively observe intrusive thoughts, and then gently disengage from them to return to the world you've created.

## 4 Keep a gratitude journal

Reflecting on the positive experiences, feelings, and relationships in your life can bring you greater joy. A gratitude journal is a good way to acknowledge the things that brighten your life and help you turn your focus away from negative thoughts and feelings.

Keep a journal by your bed so that at the end of each day,

you can spend five to 10 minutes writing about something that you were grateful for in your day. Savor pleasant sights, sounds, and experiences—a sunset, the birds chirping outside your window, a hug from your child, or a call from a friend. Celebrate accomplishments large and small—learning to master a new hobby,

doing well on a project at work, or getting the kids off to school on time.

Conjure up the scene in your mind and try to write about it in detail. Then, spend a few minutes soaking in the experience again. You can also use this journal to reflect on things from the past that you are grateful for.

## 5 Deflate cognitive distortions

When you recognize negative thoughts cropping up, take the following steps.

**Stop:** Consciously call a mental time-out.

**Breathe:** Take a few deep breaths to help release burgeoning tension.

**Reflect:** Ask some hard questions. Is this thought or belief true? Did I jump to a conclusion? What evidence do I actually have? Am I letting negative thoughts balloon? Is there another way to view the situation? What would be the worst that could happen? Does it help me to think this way?

**Choose:** Decide how to deal with the source of your stress. If distortion is the root of the problem, can you recognize this and let go? Think about the goose in the bottle (see page 29). Is the problem or constraint a real one or is it one of your mind's making? If the problem is real, are there practical steps you can take to cope with it? Practicing a mini-relaxation may also help.

## 6 Make a worry box

Everyone gets distracted by worries and concerns, but sometimes these worries can spill over, seeping into the fabric of your day. Having a place to contain your worries—quite literally—may help you set them aside so that you can focus on the more pleasurable or meaningful parts of your life.

Begin by finding or making a worry box. Any box will do. This is a great exercise for children, but youngsters may find it even more appealing if they can decorate the box as they like and keep it in a special place.

At the end of the day, take a few minutes to write down two or three of your concerns on slips of paper and place them inside the box. Or if the box is handy, you can write down worries as each crops up and drop your worries into the box throughout the day.

The worry box allows you to mentally let go of your worries. Once your worries are deposited in the box, try to turn your attention to other matters.

What you do with your slips of paper is up to you. Some people choose to throw out the notes without reading them again while others benefit from looking through them periodically before tossing them away. In that case, you may be surprised to find that most of your worrying was fruitless; the scenarios you imagined never came to pass. ♥

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whether these tasks are performed via a paid or volunteer job or while digging in the garden. They offer pleasure and sometimes the chance to be creative.

If you're retired or find that the work that pays your bills offers few opportunities for satisfaction, indulge your productive side elsewhere. The simplest task, such as slicing vegetables for dinner or scrubbing a floor, may be less tedious and more joyful if you approach it mindfully. Jobs that involve other people can spark connections that nurture you in other ways. Work that benefits others often offers special satisfactions. Such volunteer opportunities abound for people of every age and level of ability. Check with local volunteer organizations for tasks that fit your talents and available time.

The job many of us find hardest is setting aside time for pursuits defined as leisure. Reading a novel, playing a game of tennis, soaking in a hot bath, or spending a half-hour meditating may seem like selfish activities. Productive and even creative pursuits are more likely to meet with accepting nods. Yet playfulness invites joy back into your life. And relaxation enhances "flow," a state described by psychologist Mihaly Csikszentmihalyi in which creative juices are freed and their full expression is directed to all pursuits.

So, stretch out on a hammock for a nap. Enjoy a massage. Carve out 20 minutes during your busy day for breath focus or a body scan. Soak in the sounds of music you find calming or invigorating or simply pleasurable. Taking this time for yourself helps ward off exhaustion and burnout, allowing you to focus more attentively and less resentfully on the tasks of your day. Consider it a gift to yourself that also pays dividends to others.

## Journals: Easing stress the write way

If you're like most people, you've learned to bottle up "unacceptable" emotions, such as anger, fear, frustration, and grief. Sometimes, of course, the cap slips off. Then these emotions spill forth at high intensity, although not necessarily in the right direction. One safe way to decant any emotions—even the most hurtful, terrifying, or sad feelings—is

journal writing. A blank sheet of paper and a pen can offer enormous release and, possibly, insight into hidden conflicts.

Writing about traumatic events can have physical benefits, too, according to psychologist James W. Pennebaker, who began studying this issue in the late 1970s. A series of studies required one group of people to write down their deepest thoughts and feelings about the most traumatic event they recalled. A control group wrote only about trivial events. Both groups wrote for 15 minutes a day for four days. In one study, the group that expressed deep emotions

### Power of prayer

Several large studies suggest that people with an active religious life tend to stay healthier, live longer, and be happier. For example, a review article in the *Journal of the American Geriatrics Society* cited an international study of nearly 170,000 men and women from 14 countries that found religious affiliation and attendance at services significantly increased the likelihood of happiness and satisfaction. Twelve years of data from 2,800 older adults enrolled in the Yale Health and Aging Study, reported in *The Journals of Gerontology*, showed members of religious congregations had a slower onset of physical disability. Other studies on how religion affects health have noted less hostility and anxiety, lower blood pressure, and better quality of life among people with strong beliefs.

But the power of prayer is not easy to document. A 2002 study in *Annals of Behavioral Medicine* sifted through research claiming religion and spirituality have positive effects on cardiovascular disease and hypertension. The investigators disputed these results, citing numerous flawed or irrelevant supporting studies.

Still, prayer offers solace and comfort to many people. Religious communities can be part of a larger social network that keeps a person afloat with emotional support and outright assistance (see "Social support," page 19). By reinforcing positive emotions, religious belief might stimulate healthy physiological responses through complex nervous system pathways, much as a constant flood of negative thoughts may set the opposite reaction in motion. And, of course, certain religions encourage better health habits, such as avoiding alcohol and tobacco.

If prayer is meaningful to you, it can enhance the relaxation response and perhaps your health as well. You may want to use your favorite prayer or a phrase from it to help you focus.

reported feeling better and also had significantly fewer doctors' visits and symptoms of illness for nearly half a year afterward. After a similar experiment, the group that revealed deep emotions had livelier immune system defenders called T cells for the next six weeks. Other research has found that people with asthma and arthritis benefit from journal writing, too.

Why does writing about emotional issues make a difference in physical and emotional health? Pennebaker theorizes that confiding bottled-up feelings relieves stress that otherwise would ratchet up blood pressure, heart rate, and muscle tension.

Clinicians at the Benson-Henry Institute for Mind Body Medicine have found that the following journal exercise helps relieve ongoing sources of stress. A single attempt is not enough, though. When you first sit down to write about a problem, you may feel more anxious. The wound, once exposed, may initially hurt more than it did while hidden. But continuing to write about the same problem over

## Affirmations

Affirmations are statements that express love, acceptance and, often, a joyous vision for your self and your life. A stream of positive thoughts can drown out more negative ones. Try incorporating simple affirmations, such as "I breathe in healing" or "I breathe out tension," into relaxation techniques. Or paste them to your mirror or another prominent place where you can read them several times a day. The more often you repeat an affirmation, the more likely you are to believe it and act on it.

Whether you write your own affirmation or borrow one from a helpful bumper sticker ("One day at a time"), the words should resonate for you. When creating an affirmation, choose a stressful aspect of your life and decide what a positive outcome would be or how you wish you felt about the situation. Try to craft statements in first person and present tense, such as these:

- "I can do this."
- "I am doing my best."
- "I am calm."
- "I deserve respect."
- "Week by week, I am growing healthier and stronger."
- "I can relax my body."
- "I am a loving, caring person."

the course of several days often enables you to work through difficult emotions and reach resolution or acceptance.

## Writing it out

Here's some advice before you begin:

- Deeply troubling events and situations, such as domestic violence, rape, or direct exposure to acts of terrorism or war, are best explored with an experienced therapist. For other situations, you can proceed on your own and seek professional help only if you feel you need assistance.
- If you're physically healthy, choose the most stressful event or problem you currently face. It's usually one that you frequently dwell upon. Or, if you think your current problems stem from past circumstance, write about upsetting events in your past.
- Truly let go. Write down what you feel and why you feel that way.
- Write for yourself, not others. Don't worry about grammar or sentence structure. If you run out of things to say in the time allotted, feel free to repeat yourself.
- Do this exercise for 15 to 20 minutes a day for three to four days, or as long as a week if you feel writing continues to be helpful.

## Bringing more joy to your life

You needn't only write about sources of stress. Another approach is to keep a gratitude journal (see page 24) or to use a journal to identify ways to bring more joy and meaning to your life. For this exercise, set aside 10 minutes a day to write in your journal about any positive event that's taken place in your life. Perhaps it was having a baby, getting a coveted job, touring the French countryside, or getting an advanced degree. Focus on how you felt at the time and on your feelings now. After you're done writing, take a few minutes to reflect on your emotions. Did you feel proud of a hard-won accomplishment? Exhilarated by a new experience? Awash in love and acceptance because of a connection with a loved one? Now look for ways to experience those feelings again. Can you find opportunities in the present that might bring you those same feelings?

## Cognitive restructuring: You are what you think

Stop for a moment and try to remember the thoughts that were running through your head as you got dressed for work this morning. What were you saying to yourself? What were you thinking? Then think about how you felt.

Perhaps a simple thought, such as “the train is late,” quickly drifted out of control. Suddenly, you were thinking: “I’ll be late to work. I won’t make it to my meeting on time. My boss will be angry with me. My job is in jeopardy.”

Sometimes even seemingly happy thoughts hurtle down the same track. “Wonderful, the lab report says my biopsy results are negative!” can quickly turn to “I wonder how good that lab is? Maybe the results were positive, and the lab didn’t pick it up. Cancer that’s undetected gets worse. By the time the error is found, it could be too late.”

These scenarios are examples of automatic thinking. They can engage the stress response almost as easily as a growling Doberman bounding in your direction.

So, too, can the barrage of negative thoughts that many people play through their minds on an endless loop, or flip on automatically when faced with certain people or situations. Familiar examples include: “I look awful,” “I can’t do this,” “I’m stupid,” “I’m such a screw-up,” and “I’m a loser.” The voice may be yours or that of someone else from your life, such as an overly critical parent. Even in the absence of obviously stressful situations, this inner critic can make you miserable and stressed.

Cognitive therapy is built on the premise that thoughts and perceptions shape moods and emotions. A stream of highly negative thoughts may contribute to depression and anxiety. These negative thoughts are often riddled with irrational distortions and exaggerations. They can be examined and deflated, though, once you learn the skills of cognitive restructuring, a cognitive therapy technique that helps people change the way they think.

### Recognizing your distortions

Ten common cognitive distortions appear below. They are based on theories of cognitive therapy expounded

by Dr. Aaron T. Beck, which were further refined and brought to popular attention by Dr. David D. Burns. Do any of these distortions resonate with you? Use this list to help make you aware of ingrained negative thought patterns and try to substitute more realistic, positive thoughts.

- **All or nothing.** Everything is black or white; nothing is gray. If you don’t perform flawlessly, you consider yourself a complete failure.

- **Overgeneralization.** One negative event, such as a slight from your spouse or an encounter with a dishonest merchant, is perceived to be part of an endless pattern of dismaying circumstances and defeat. For example, you might think, “He’s always cold” or “You can’t trust anyone.”

- **Mental filter.** One negative episode, such as a rude comment made to you during an otherwise enjoyable evening, shades everything like a drop of food coloring in a glass of water. It’s as though you are filtering out all the light and only see darkness.

- **Disqualifying the positive.** Positive input, such as an affectionate gesture or outright praise, just doesn’t count. You deflect all compliments with self-deprecation. You might say, “It’s no big deal.”

- **Jumping to conclusions.** You draw negative conclusions without checking to see if they have any foundation in fact. You may be mind-reading: “My friend seems upset; she must be mad at me.” Or you may be fortune-telling: “I just know the results of my medical test won’t be good.”

- **Magnification or minimization.** You exaggerate potential problems or mistakes until they take on the proportions of a catastrophe. Or you minimize anything that might make you feel good, such as appreciation for a kind act you did or the recognition that other people have flaws, too.

- **Emotional reasoning.** You assume your negative emotions reflect the way things are. For example, “I feel inferior. Therefore, I must not be as good as others.”

- **“Should” statements.** You adhere to a rigid set of beliefs and internal rules about what you “should” be doing and feel guilty when you don’t stay the course.

- **Labeling.** Rather than describe a mistake or challenge in your life, you label yourself negatively: “I’m

a screw-up.” When another person’s behavior bothers you, you pin a global label on him or her: “She’s so controlling.”

■ **Personalization.** You blame yourself for triggering a negative event that occurred for complex reasons or for something that was largely out of your control. “If I had taken care of myself properly, I never would have gotten cancer.”

Other clues can also help you identify distorted thinking. Sentences that include the words “must,” “should,” “ought,” “always,” and “never” are often harsher than necessary and reflect rigid thinking that could stand to be softened.

### **Stop, breathe, reflect, choose**

If you’re like most people, some of the distortions listed above are familiar to you. The next step is to challenge any overly simplistic, negative thoughts that cause you unnecessary distress. It’s easiest, of course, when the thoughts are patently untrue: “I never do anything right,” for example. It’s harder when there’s an element of truth mixed in with simplistic falsehoods: “At my age, I know I’ll never reach my goals.” If you always longed to be a famous opera singer but you lacked the time and talent to bring your dream to fruition, that statement may apply. For *one* goal. Most likely, though, you could list other goals that you did reach. And if you scaled down your dream by realizing that you enjoy singing, whether or not the audience of the Metropolitan Opera pays rapt attention, you could even set course for a new goal and actually meet it.

This four-step process taught at the Benson-Henry Institute for Mind Body Medicine is one way to help derail stress that stems from distortions and negative thoughts:

■ **Stop.** Consciously call a mental time-out. The next time you feel stressed, simply say “Stop.” This stops the negative stress cycle in its tracks.

■ **Breathe.** Take a few deep breaths to reduce physical tension and help you relax.

■ **Reflect.** Ask yourself the following questions: Is this thought or belief true? Did I jump to a conclusion? What evidence do I actually have? Am I letting negative thoughts balloon? Is there another way

to view the situation? What would be the worst that could happen? Does it help me to think this way?

■ **Choose.** Decide how to deal with the source of your stress. If a distortion is the root of the problem, challenge your thinking and adjust your view of reality. Ask yourself the following questions: How else can I think about this? What else can I do to cope more effectively? Remember, most things we worry about never come to fruition.

Restructuring negative thoughts and distortions takes practice. You needn’t ignore reality or put on an artificially happy face. Often it’s possible to shift your focus toward the positive, rather than dwelling on the negative. At other times, you can acknowledge a painful truth without losing sight of the larger, more positive picture.

For example, “I should be practicing relaxation response techniques every day” can be rephrased as “I want to practice relaxation response techniques every day,” or “I feel calmer and happier when I practice relaxation response techniques regularly.” Rather than

**Optimists are more likely to put a positive spin on stressors, look for ways to make the best of a bad situation, and use problem-solving strategies to tackle difficulties.**

berating yourself for falling short, encourage yourself to keep finding time.

When an illness flares up and leaves you feeling hopeless, it may help to acknowledge this without allowing it to engulf you. Change “I’ll never get any better” to “I feel sick and in pain today. I know that I can try a combination of medications and techniques to help relieve my discomfort. Next week, I’ll probably feel better and be able to follow my normal schedule.”

Often, you can benefit from a friend’s perspective on a problem or issue that seems insurmountable. He or she may recognize a major flaw in your thinking that has escaped your notice. Or it may help to distract yourself from the problem rather than continuing to worry about it. Try a mini-relaxation or calm yourself through imagery.

If distortions are particularly thorny or deeply ingrained, seek help from a licensed mental health professional who has experience with cognitive restructuring, or attend a mind/body program.

### **Schedule your worries**

You may also find it helpful to structure your worry—either by setting aside a time to worry (see below) or creating a place to “hold” your worries (see “Make a worry box,” page 24). These techniques can help you keep negative thoughts and fears from weaving their way throughout your days.

At times when your mind is racing, you feel overwhelmed and anxious, and you can't seem to focus, call a time-out for yourself. Set a timer for 15 minutes and write down everything that you're worried about. But when the buzzer sounds, put your worries away and allow yourself to be fully present. Try to accept your concerns and fears without judgment. Practicing mindfulness meditation (see page 15) may help with this task.

If you are going through a tumultuous or difficult time—perhaps you are in the midst of a divorce or you are facing a financial setback—and worry is persistent, you may find it helpful to set aside a specific time each day to record your worries.

### **Consider the goose in a bottle**

When you find yourself jumping to conclusions or dwelling on negative thoughts, the “goose in the bottle” exercise may help challenge your thinking. The exercise has its roots in a well-known Zen koan that asks us to consider how to free a goose from a glass bottle.

In this story, an official asks a Zen master to consider this problem: a man places a gosling in a bottle, feeding it through the neck of the bottle until it is fully grown and there is no room in the bottle anymore. How can the man get the goose out without harming it or breaking the bottle? The master imagines the scene and then shouts, “See! The goose is out.”

The mind created this problem; the goose was imagined in the bottle and can just as easily be imagined out of it. The story is a reminder that worry is the misuse of imagination.

The next time you are playing out worst-case scenarios or allowing negative thoughts to snowball,

stop and picture the goose. Ask yourself: “Is this just a goose in a bottle?” And consider how else you can think about the situation.

## **The role of positive psychology**

Positive psychology is an emerging field recognized by the American Psychological Association, and many experts who design stress-management programs harness its principles. It focuses on determining and promoting the factors that permit people to thrive. Rather than search for the roots of unhappiness, research coming out of this field investigates the ingredients of a good life and weighs the effects of traits like optimism, humor, and even eccentricity.

Optimists, for example, tend to do better than pessimists when coping with stressful situations. They are more likely to put a positive spin on stressors, look for ways to make the best of a bad situation, and use problem-solving strategies to tackle difficulties.

Some studies indicate that optimists often fare better physically, too. A long-term study of more than 830 people found that those classified as pessimists had a 19% higher risk of mortality over the course of 30 years than those who were optimists. In addition, a 10-year study of 1,300 men suggested that a sense of optimism may protect older men against heart disease. Supporting that is a 2007 study of approximately 2,900 healthy adults that found that those who reported upbeat moods had lower levels of cortisol, one of the stress hormones that may contribute to high blood pressure and decreased immune function. In addition, women with positive outlooks had lower levels of two inflammatory markers, C-reactive protein and interleukin-6; high levels of these substances may contribute to type 2 diabetes and atherosclerosis, the buildup of fatty deposits in arteries that can cause heart attacks and strokes.

If you're not a natural optimist, this information could merely fuel your pessimism. Don't let it. Take a deep breath and relax. Evidence suggests that avoiding pessimism is more important than boosting optimism. It's true that there are people with naturally sunny natures, but it's equally true that the way you handle yourself emotionally owes a great deal to nur-

## ► Boost your happiness

Looking for ways to feel happier and fight off depression? A recent study found that these exercises delivered positive results, particularly when they are done regularly.

- **A gratitude visit.** Identify someone who has been particularly kind to you whom you haven't thanked properly—perhaps a parent, friend, teacher, coach, teammate, or employer. Try to choose someone you can meet with in person. In the next week, write a letter of gratitude to that person and then hand-deliver it. Make your letter as specific as possible, spelling out what the person did for you, how often you remember those efforts, and what effect they had on you. When you meet, read your letter aloud to the recipient. Afterward, think about the following questions: How did you feel as you wrote your letter? How did the other person react to your letter, and how were you affected by the reaction? Is there someone else you would like to express your gratitude to in a similar way?
- **Three good things in life.** For the next week, each night reflect on your day and find three things that went really well. Spend 10 minutes writing about them in a journal, including information on why they went well. It's important to record these in a journal, rather than simply noting them

in your head. The things don't need to be momentous. They could be as simple as reading a bedtime story to your toddler or having your spouse pick up ice cream for dessert. Then, next to each positive event, answer this question: "Why did this good thing happen?" For example, someone might write that her husband picked up ice cream "because my husband is really thoughtful sometimes."

- **Using signature strengths in a new way.** The study participants were asked to fill out a character survey that identified their top five strengths. At the time this report went to press, the survey was available online at <http://www.authentic-happiness.sas.upenn.edu>. You can take the survey to identify your character strengths. Or, if this isn't possible, reflect on your own character and try to find five qualities that are your strong suits. You may want to ask a supportive friend or family member to help you identify these character strengths. After doing this, choose one of your strengths, and every day for the next week try to use it in a different way.

*Adapted and printed with permission from Martin E.P. Seligman, Ph.D., Director of the University of Pennsylvania Positive Psychology Center and author of Authentic Happiness (New York: Free Press, 2002) and Learned Optimism (New York: Vintage Books, 2006).*

ture. With practice, your current outlook and behaviors can change for the better.

You may already have tried some techniques used in positive psychology. They include cognitive restructuring and journal writing, as well as emphasizing the importance of intimate bonds. Other techniques help people tap into a sense of gratitude and thankfulness or simply a sense of humor. All of these therapeutic approaches focus on amplifying the positive.

A study that assessed the effects of several different happiness exercises found a few that were particularly effective in increasing happiness and decreasing depressive symptoms. The researchers—who included Martin Seligman, the director of the University of Pennsylvania Positive Psychology Center and a leader in the positive psychology field—asked 577 adults to perform one of five happiness exercises or a placebo (writing down their early memories every night for one week). The participants completed two surveys—a happiness index and a depression scale—before and after performing the exercises.

Two of these exercises —“Using signature strengths in a new way” and “Three good things”—had lasting effects, increasing happiness and decreasing depressive symptoms for as long as six months. The researchers had asked the participants to perform these exercises for one week, but in follow-up interviews they found that those who continued the exercises on their own got better, longer-lasting results. Another exercise, “Gratitude visit,” delivered the best initial results—boosting happiness scores and lowering depressive symptoms considerably—but the effects disappeared by the three-month mark. For information on how to perform these exercises, see “Boost your happiness,” above.

In addition, there have been many intriguing studies on humor. Researchers have found that laughter boosts immune system activity and lowers the amount of circulating stress hormones, such as adrenaline and cortisol. No wonder many mind/body practitioners prescribe laughter. They often urge patients to rent funny movies, read amusing books, and embrace the absurd in daily life. ♥

# The different faces of stress

Perceptions of what constitutes a stressful situation and reactions to stress vary from person to person. Yet all of us are influenced by a number of broad issues. Are you male or female? How old are you? Are you working? Or do you wish you were? Are you caring for an elderly or sick relative? This section explores the different faces of stress.

## Sex and stress

The physiology of the stress response is similar for everyone. But some researchers believe that there are distinct differences in the way women and men experience and respond to stress.

Community surveys taken in many countries find women consistently report greater distress than men do. A study of roughly 1,100 American adults that appeared in the *Journal of Personality and Social Psychology* found that women were more likely than men to experience ongoing stress and feel that their lives were out of their control.

Why the disparity? Some researchers believe that the social responsibilities typically handled by women—including child care, care of older relatives, and housework—expose them to more abundant opportunities for distress. These responsibilities constitute the “second shift” for women who work outside the home. This additional burden can lay the groundwork for long-term health problems, as was demonstrated in a large study of nurses. The women in the study charged with caring for a disabled or chronically ill spouse for nine or more hours a week were at increased risk of having a heart attack or other manifestation of coronary artery disease over a four-year period. Men, on the other hand, more often report financial stress than women do, which makes sense since men are traditionally expected to be breadwinners.

Another study asked 166 married couples to keep a daily diary tracking 21 common stressors, such as

arguments and overloads at home and work, for six weeks. Wives proved 5% more likely than husbands to report days marked by “any distress” and 19% more likely to experience “high-distress” days. The women did not typically carry feelings of “high distress” from one day to the next, but did report facing a greater overall number of stressful situations. Certain demands affected men or women more. Men reacted more strongly to an argument with a child, financial woes, or work overload, for example, while women were more distressed by arguments with a spouse, transportation difficulties, or family demands.

Some interesting preliminary research suggests women and men tend to cope with stressful situations differently, too. A team of UCLA psychologists published a study in *Psychological Review* suggesting that women are less likely to fight or flee when faced with stressors. Instead, they are likely to “tend-and-befriend.” “Tending” is nurturing behavior designed to protect and relieve distress. “Befriending,” which may support tending, refers to seeking and maintaining social connections.

The researchers believe sex hormones and the pituitary hormone oxytocin are partly responsible for such differences and suggest the behavior may have held evolutionary advantages for women. Oxytocin dampens anxiety and induces relaxation. Its effects are enhanced by female sex hormones and diminished by male sex hormones. When under stress, both men and women release adrenaline and cortisol; men also release testosterone, which tends to increase hostility and aggression. The impulse to fight or flee in the face of danger could have disastrous consequences for women, who tend to be smaller than men and may be pregnant or caring for small children. It is intriguing to speculate on whether “tend-and-befriend” could have positive consequences for women. After all, social connections are key to reducing the damaging effects of stress (see “Social support,” page 19).

## Age and stress

Does age have any effect on stress? Certainly some major life events, such as the death of a spouse, illness, and accidents, are more likely to touch you with time. Ailments more common among older people, such as heart disease, arthritis, and cancer, are significant sources of pain and disability. Side effects from medications and other treatments can be unpleasant daily realities. Sleep disturbances are also common in later life. Any or all of these can be a source of stress.

A dwindling interest in exercise—tied, perhaps, to osteoporosis or compromised vision, hearing, and balance as you grow older—can make you more of a shut-in than you would like to be. This can set off a cycle of declining physical abilities and increasing frailty. Is that stressful? Just ask anyone who worries

### Tips for taming stress for older adults

- Attend a mind/body program. Some are specifically designed for seniors. Others may focus on chronic pain or specific ailments, such as heart disease (see “Resources,” page 43).
- Ask your doctor whether you might benefit from certain types of exercise, such as tai chi, which enhances balance and aerobic capacity, or strength training, which has been shown to build bone density and muscle strength in elderly people. Many other kinds of physical activity improve your health, lift your mood, and reduce stress, too.
- If insomnia is a considerable source of stress, cognitive behavioral therapy may help. This form of therapy aims to correct ingrained patterns of self-defeating behavior and negative thoughts. In a randomized, controlled study of 78 older adults published in the *Journal of the American Medical Association* in 1999, cognitive behavioral therapy was significantly more effective than sleep medication for improving insomnia over sustained periods. Ask your doctor to recommend a therapist or counselor who could help.
- If disability is a source of stress, talk with your doctor, a geriatrician, an occupational therapist, or a staff member at your local council on aging about changes in your home that might help you live more independently.
- Consider whether you might benefit from cognitive restructuring techniques or a course in assertiveness training that would help you state your wishes and handle conflicts.

that a walk outside might end in broken bones or finds it difficult to do simple tasks around the house. People do adapt to changing abilities, it's true, but the road to that point may not be smooth.

Cultural training may make a difference, too. Older people were raised at a time when emotional displays were frowned upon. Many older women never learned how to state needs directly and handle uncomfortable conflicts before they become a source of stress; nor did they have abundant opportunities to work outside of the home, which offers creative, productive outlets to some women. On the other hand, many do take comfort from religion, which may have an effect on health and longevity.

Some preliminary evidence suggests that disturbances in the HPA axis, which controls the stress response (see page 2), compound certain health problems that are common among older people, such as cardiovascular disease and stroke. Aging and long-term stress both appear to trigger these disturbances in some people. Constant exposure to certain stress hormones, such as cortisol, can harm nerve cells in the hippocampus, potentially affecting learning and memory processing.

Fortunately, not all of these consequences are written in stone. Once you identify key sources of stress in your life, odds are good that you can overcome them. It's possible to prevent or at least combat physical decline and some age-related ailments through exercise, good nutrition, appropriate medications, and stress-control techniques. Also try the “Tips for taming stress for older adults,” at left.

## Caregiving and stress

Caring for others fulfills a basic social contract in ways that can draw generations and individuals closer to one another. Certainly, caring for an elderly parent or ailing spouse is a worthy, often satisfying pursuit. But it isn't easy. If you're a caregiver, you may often wrestle with stress as well as exhaustion, anger, guilt, grief, and other difficult emotions.

More often than not, caregivers are women. The task is especially hard on women in the so-called sandwich generation, who are simultaneously caring

for children and older parents, quite possibly while working outside the home, too.

While you attend to the needs of others, your own sense of well-being may head south. Studies of men and women responsible for the long-term care of relatives show higher rates of illness, suppressed immune response, slower healing, and even increased mortality among caregivers. Additionally, research pub-

### Tips for taming caregiver stress

- The relaxation response (see page 10) and self-nurturing techniques (see "Nurturing yourself," page 20) are vital. Practicing them often will enable you to feel calmer, happier, and better able to help others. If it's too hard to find the time, consider getting extra help with some household tasks.
- Protect your own health. Research suggests that a caregiver's immune function is often suppressed by the stress of caring for others. Boost your resistance by eating well, getting enough rest and exercise, and pursuing activities that bring you pleasure.
- A blend of assertiveness and cognitive restructuring skills can help you share the work, instead of taking on everything yourself. Spell out to other family members what needs to be done and what sort of help would be best. If no one offers help, ask for it. When someone offers, accept it. Write out a list of smaller tasks people can do, such as calling regularly, cooking an occasional dinner, and running errands, and dole these out. Or simply ask people to check off what they can do.
- Take advantage of regular respite care from professionals, family, and friends to give yourself much-needed breaks.
- Join a support group to talk out frustrations with other people in your situation and to get helpful ideas. Some caregiver support groups are available online (such as a nationwide chat group run by AARP), while others are run by local hospitals, senior centers, and community groups.
- Periodically, consider what you can offer and what assistance you need. If it's getting too hard for you to fulfill certain needs, ask family members for help or consider other options, such as hiring paid caregivers to take on these tasks. Consult a geriatric care manager or a social worker for help; your local council on aging or visiting nurse association should be able to help you find one. If necessary, consider another living arrangement that would help you meet your needs and those of your loved one.

lished in 2003 revealed that ongoing stress endured by older adults caring for spouses with Alzheimer's disease had a negative impact on the caregiver's own mental functioning.

In order to give care, you need stress relief, support, and time for yourself and your family. The "Tips for taming caregiver stress" at left may help.

## Work and stress

Americans spend more time working than they did in previous decades. Cell phones, telecommuting, e-mail, and fax machines have breached the wall between work and leisure time. Frequent threats of layoffs and the flight of industries to markets where labor is cheaper fuel worker worries. The jobs of older workers may be jeopardized by younger aspirants who are well-versed in new technologies or simply less costly to a corporation. A generally shaky economy and the rise in food and gas prices also feed anxiety.

Given this picture, is work-related stress increasing? It's hard to be certain. Some researchers have pointed out that the scales designed to measure stress at work may be too narrow to fit people in a wide range of occupations and aren't always applicable to current work practices. In addition, beneficial changes, such as the elimination of some dirty, tedious jobs and a growth in opportunities available in challenging new fields, generally get little attention. So do the positive psychological effects of work.

Perhaps a better question, then, is how does your job affect you? Does it engage and energize you or leave you sapped? Does it satisfy you? Do you get the support you need to do your job? How much control do you have over your work? A study of almost 21,300 female registered nurses found those reporting minimal control over their jobs, little social support at work, and high job demands were more likely to be in poor health when data collection started. They also suffered greater functional declines during the next four years. In this study, published in *BMJ* in 2000, job control depended on the worker's ability to acquire and apply new skills on the job and to have decision-making authority. Women in jobs with the highest control and lowest demands stayed healthiest.

## Tips for taming work-related stress

- Try a mini-relaxation (see page 23) for fast relief.
- Halt cognitive distortions before they get too strong a toehold. Remember to stop, breathe, reflect, and choose (see “Cognitive restructuring: You are what you think,” page 27).
- Take a 10-minute break for a body scan (see page 13) on days when tension builds up.
- Practice self-nurturing techniques at work as well as outside of it (see “Nurturing yourself,” page 20). Buy flowers for your desk, have lunch with your favorite co-workers, or strap on your in-line skates for a lunchtime spin.

A more recent study linked job stress and heart disease. Researchers conducting the 2008 study, which involved 10,000 London-based male and female civil servants, found that chronic work stress was associated with coronary artery disease, especially among people under age 50.

No matter how you rate your job, you can find ways to defuse the stress response whenever work

triggers it. Start by trying the “Tips for taming work-related stress” at left.

Not working can be as stressful as working. Answering the often-asked question “What do you do?” can be troubling to people who are unemployed or retired. Even those who work as homemakers may feel anxious about it. Too often, the jobs held by people define their places in society. Labels such as “stay-at-home mom,” “retired,” and “laid off” conjure up stereotypes. Then there are the financial pressures of not working or working in a nonpaying job.

You can counter these stressors in many ways. Addressing cognitive distortions (see “Cognitive restructuring: You are what you think,” page 27) can help you manage realistic and unrealistic fears. Practicing relaxation and self-nurturing techniques will lower your stress levels. And bookstores are filled with career advice ranging from identifying the work you love to acing job interviews. Be aware, too, that there is a life beyond work where satisfaction and opportunity exist (see “Creativity, productivity, and leisure,” page 20). ♥

# How stress affects the body

A great deal of research suggests exposure to long-term stress can harm your body. Chronic stress influences high blood pressure and heart disease. It may also suppress the immune system and have implications for asthma, gastrointestinal disorders, cancer, and ulcers. Additionally, emerging research now supports the popular notion that high levels of stress somehow speed up the aging process.

A 2004 study that followed mothers of chronically ill children showed that the stress of caregiving actually caused these women to age faster on a cellular level than did the mothers of healthy children who constituted the control group. When cells divide, the protective caps on the ends of the chromosomes, called telomeres, shorten slightly with each replication. The telomere length of the stressed caregiving mothers indicated that their cells had aged an additional nine to 17 years over the normal aging pace of the low-stress group.

What explains the physical toll of stress? Reasons stress could be harmful include direct effects—such as through long-term suppression of the immune system, causing stickier-than-normal platelets, slowing wound healing, or constricting major blood vessels—and indirect effects on behavior. People respond to stress in many

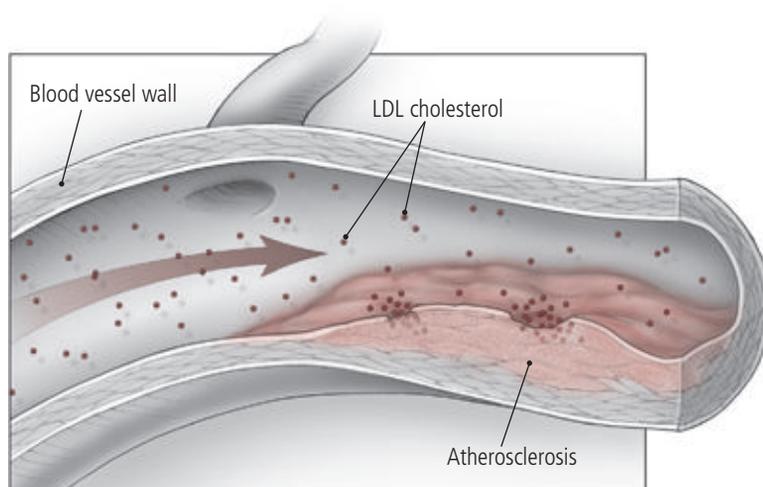
ways, not all of them healthy. Overeating, smoking, drinking too much, not exercising enough, and engaging in other risky behavior can certainly take a toll.

What does this body of research mean to you? It suggests that you can avoid or ease the negative effects of stress through regular use of the methods outlined in “How to prevent and manage stress” on page 10. While stress-relief techniques can help, some conditions require other treatment. Your doctor can recommend the treatment plan that’s best for you.

## Stress and cardiovascular disease

Cardiovascular disease encompasses a range of ailments that affect the heart or impinge upon the thousands of miles of blood vessels that nurture cells throughout the body. Three obvious examples are atherosclerosis (the accumulation of fatty deposits on artery walls), heart attacks, and strokes. The landmark Framingham Heart Study noted that certain factors raise the risk of cardiovascular disease. Some, such as race, age, sex, and genetics, are beyond your control. But others lie within your sphere of influence. Traditionally, the “controllable” risk factors have included smoking, inactivity, obe-

**Figure 5** Inside a narrowed artery



Stress may damage your arteries. Scientists theorize that stress hormones increase cholesterol levels. People with high levels of low-density lipoprotein (LDL) cholesterol are more likely to develop atherosclerosis, which is the buildup of fatty deposits on artery walls. As the mixture of fats, calcium deposits, and cell debris accumulates on artery walls, the channel that the blood flows through becomes progressively narrower. Eventually, blood flow is obstructed. The blockage can cause angina, a heart attack, or stroke.

sity, high blood pressure, high blood cholesterol, and diabetes. Psychological stress appears to be a potent risk factor as well. One three-year study asked 2,700 American adults to complete an online survey of physical and mental health following the Sept. 11 terrorist attacks. People who had high levels of stress immediately after the attacks were nearly twice as likely to develop high blood pressure and more than three times as likely to develop heart problems during the following two years compared with those who had low stress levels.

In addition, research indicates that a number of psychological and social factors—including depression, anxiety, anger and hostility, a lack of social support, work stress, marital stress, low socioeconomic status, and caregiver strain—play significant roles in the development of cardiovascular disease. Acting alone, each of these factors heightens the chances of developing heart disease. When combined, their power increases exponentially. On a more positive note, the reverse is also true—treating depression, controlling anger and hostility, and improving social support can lower your odds of developing cardiovascular disease.

How might stress contribute to cardiovascular dis-

ease? Several avenues are under study. The release of stress hormones, such as adrenaline, into the bloodstream appears to increase the amount of cholesterol made by the body. Repeated arousal of the sympathetic nervous system can trigger changes that increase the risk of heart disease. For example, when the sympathetic nervous system is aroused, blood pressure rises and platelets become stickier (see “The stress response,” page 2). Stickier platelets make blood clots more likely, while ongoing high blood pressure damages the heart, blood vessels, and other organs, and greatly increases your chances of developing heart disease.

Dysregulation of the immune system and inflammation have also been implicated. Chronic inflammation plays key roles in the process leading to cholesterol-clogged arteries and heart attacks. Inflammation is an intricate dance involving different types of white blood cells, the antibodies they make, and a dizzying array of chemical messengers known as cytokines. Its aim is to defend the body against bacteria, viruses, and other foreign invaders, to remove debris, and to help repair damaged tissue. Inside arteries, however, inflammation helps kick off atherosclerosis

## ► Exploring the links between relaxation techniques and protective chemicals in the body

Can relaxation response techniques boost the production of certain substances that protect the body from illness and help stifle pain? Research suggests that they can.

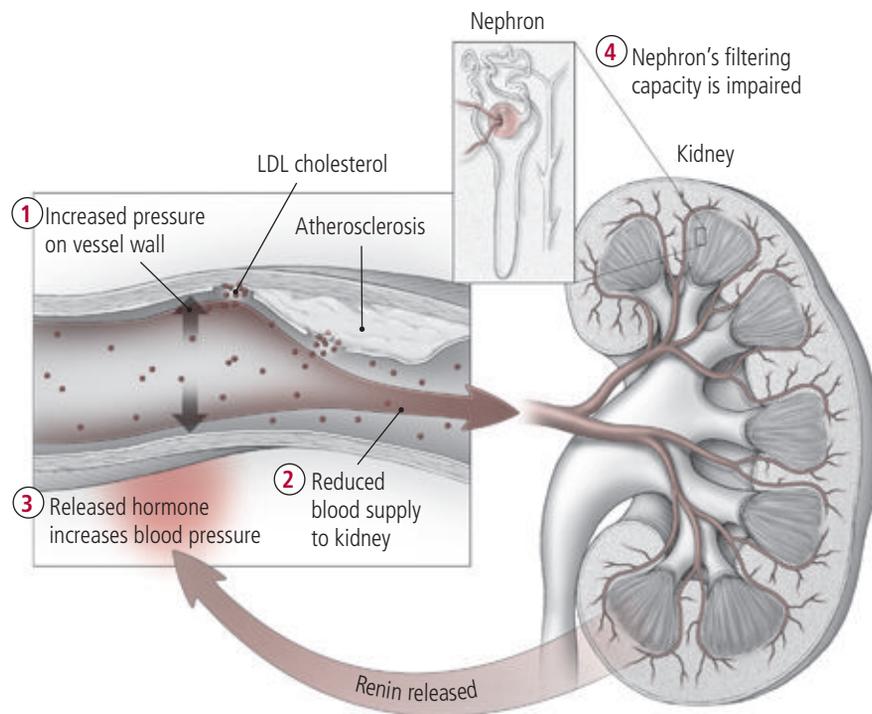
In 2005, a team of Harvard Medical School researchers led by Dr. Jeffrey A. Dusek found that the relaxation response is associated with production of nitric oxide, a substance that offers a variety of health benefits. In this study, oxygen consumption and nitric oxide exhalation were measured in participants at the start of the trial, then again after eight weeks of training in the relaxation response. While there was no correlation between the two measurements at the beginning of the program, by the end, oxygen consumption had decreased in proportion to an increase in nitric oxide production in the people who used the relaxation response. A similar change wasn't observed in a control group.

What are the benefits of nitric oxide? In a complex study published in 2001 in *Brain Research Reviews*, a research team led by George B. Stefano investigated its multifaceted role. This molecule is present in human tissues and is best known for dilating blood vessels. But it performs other vital functions as well. It acts as a signaling molecule shuttling communi-

tions between key body systems, dampens the activity of certain immune cells, and inhibits blood clotting. It also has antibacterial and antiviral properties. In fact, it stimulates activation of an enzyme that leads to the release of enkelytin, an antibacterial peptide, and enkephalins, compounds that enhance mood, reduce pain perception, and stimulate some immune system cells. To the researchers, this suggested that having sufficient levels of nitric oxide offers potential protection against microbes, health problems such as hypertension, and overzealous activity in the immune and vascular systems.

Stefano and his team also pondered intriguing connections between the relaxation response and the placebo effect, a phenomenon that turns a person's positive expectations or deeply held beliefs into an effective tool against illness. They posited that both the relaxation response and the placebo effect work through a complex connection of mind/body networks that prompts the release of nitric oxide, enkelytin, and enkephalins and harnesses their beneficial effects. The placebo effect, which can have beneficial health effects, is automatic, or perhaps the result of conditioning. The relaxation response, on the other hand, can be learned.

**Figure 6** A cycle of damage



Stress can contribute to high blood pressure, which can set the stage for atherosclerosis and sometimes kidney damage. High blood pressure can cause tiny cracks in the lining of arteries. These cracks provide a breeding ground for fatty deposits. As the deposits accumulate along artery walls, blood flow is hampered. If the arteries that feed blood to the kidneys are affected, the body reacts by producing renin, a hormone that causes small arteries known as arterioles to narrow further. This kicks off a cycle of even higher blood pressure and further kidney damage. Over time, the diminished blood flow can damage or destroy the nephrons, the tiny filtering units inside your kidneys. When this happens, the kidney cannot filter wastes properly.

and keeps the process smoldering. Atherosclerosis can narrow blood vessels dangerously, causing chest pain, a heart attack, or a stroke (see Figure 5). Inflammation even influences the formation of artery-blocking clots, the ultimate cause of heart attacks and many strokes.

In addition, stress has an indirect influence, with negative emotions shaping behaviors that affect cardiovascular risk. People who are stressed are more likely to smoke and less likely to engage in physical activity.

Research also shows that sudden spasms in coronary arteries can be brought on by mental stress—at least when people with existing heart disease are asked to do complex equations during laboratory experiments. A sudden spasm can block blood flow to part of the heart, causing temporary chest pain or even a heart attack.

An ambitious research project published in *The Lancet* in 2004, which involved over 24,000 participants from 52 countries, demonstrated the role of stress in heightening heart attack risk. Roughly 11,000 patients who had just had a first heart attack were asked, as they left the hospital, about various forms of stress they had experienced in the preceding 12 months. The questions probed reactions to job and home stress, financial problems, and major life events. Members of a control group, who were

matched to the patients for age and sex but had no history of heart disease, underwent similar assessments. Despite variations in the prevalence of stress across countries and ethnic groups, increased stress levels conferred a greater risk of heart attack than did hypertension, abdominal obesity, diabetes, and several other risk factors.

## Stress and cancer

Can stress cause cancer? Currently, there isn't any evidence to suggest that stress can do so by itself. But whether long-term stress may play a role by tampering with immune defenses is a question that bears closer scrutiny. One theory about how cancer develops suggests that cancerous changes in cells occur frequently for a variety of reasons, but the immune system recognizes the cells as aberrant and destroys them. Only when the immune system becomes ineffective are the cancer cells able to multiply. Chronic stress can hamper the immune system, and this might affect the body's ability to head off the uncontrolled proliferation of cancerous cells.

What is clear, however, is that stress management can have a role in cancer recovery. A 2005 study of women undergoing breast cancer treatment concluded

## Stress and ulcers

Just a few decades ago, ulcer patients were routinely advised to eat bland foods and cut sources of stress from their lives. Then scientists identified the bacterium *Helicobacter pylori* as a key instigator in the development of peptic ulcers, and antibiotics became the weapon of choice to combat them. Now the pendulum is swinging back some of the way. A 13-year study of more than 4,000 people found that those who believed their lives were stressful were nearly twice as likely to get ulcers.

Experts believe that stress may hamper the body's ability to repair the wall of the gut. Many studies have found that stress affects wound healing, which could clearly have implications for ulcers, even those created by bacteria. One experiment with medical students, for example, found that small incisions made in the forearm three days before a major exam took 40% longer to heal on average than when they were given during summer vacation. Stress might affect ulcers in other ways, too. It may trigger more gastric secretions, which increase inflammation and lessen the body's ability to buffer gastric acids.

that a high stress level preceding the cancer diagnosis resulted in a lower physical and emotional quality of life immediately after treatment and even a year later.

In another study, women with Stage I or II breast cancer underwent a 10-week program of stress management and relaxation training. Similarly diagnosed women in a control group were not offered the training. At the end of the study period, researchers measured the levels of the stress hormone cortisol in each group. Women in the group that received the training had lower cortisol levels. Interestingly, their lower cortisol levels were connected not to lower stress levels, but to a greater awareness of the positive effects of their illness, such as better family relationships and an increased sense of purpose in life.

## Stress and high blood pressure

The pumping action of your heart keeps blood circulating throughout your body. That blood carries nutrients and oxygen to billions of cells and carts off carbon dioxide and other metabolic debris to the organs responsible for their disposal. The force that moves the blood along can be measured as blood pressure. Blood pressure fluctuates throughout the day, spiking when you exercise or get upset and dipping when you rest quietly or sleep.

As mentioned earlier in this report, the release of stress hormones causes your heart to beat faster and your blood pressure to rise. Often, this rise is temporary, and your heartbeat slows and your blood pressure drops once a threat has passed. But if the stress response is triggered repeatedly, blood pressure may remain consistently high.

High blood pressure, or hypertension, is dangerous for several reasons. It forces the heart to pump harder to circulate blood. Eventually, the muscles of the heart respond by thickening. But this doesn't necessarily translate into added strength. In fact, often the heart's blood supply doesn't increase to the same degree, and, over time, the heart weakens. This can lead to heart failure.

High blood pressure also damages artery walls in a way that promotes atherosclerosis. By narrowing arteries and interfering with blood flow, atherosclerosis can lead to a host of health problems, including angina (chest pain), heart attack, stroke, and kidney damage (see Figure 6). In fact, the higher your blood pressure, the greater your risk for heart attack, heart failure, stroke, and kidney disease.

## Stress and the immune system

Studies suggest that the immune system is affected by both short-term sources of stress, such as academic exams or a fender-bender, and long-term sources, such as job strain or ongoing conflict with a spouse. However, while a great deal of research has been done on this topic, until the science of human immunity is more fully understood, the effect of stress on the body's ability to resist disease remains uncertain.

With that said, short-term stress creates a temporary increase in certain measures of immune system activity. For example, it's been shown to boost the transfer of infection-fighting cells called lymphocytes from the bloodstream to the skin, which some researchers think could help block infection and enhance healing. Long-term stress, however, appears to have different effects on certain immune cells. For example, natural killer cells, which attack virus-laden cells and certain tumor cells, may be suppressed by chronic stress. Viruses may also exploit vulnerability created by stress.

Once affected by stress, how swiftly does the

immune system rebound? That depends on the original source of stress and the individual. But worrisome changes in immune function have remained apparent for weeks and months following earthquakes and hurricanes. One study of current and former caregivers of spouses with Alzheimer's disease found that natural killer cells were significantly subdued among the caregivers compared with a control group. On average, this dampening of the immune system continued for three years after the role as caregiver ended.

## Stress and asthma

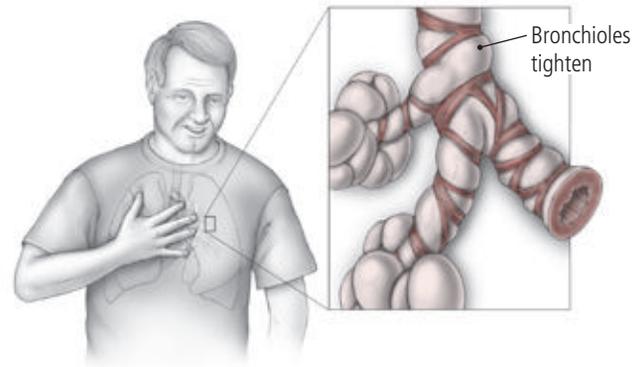
The bronchioles are small airways inside the lungs. Oxygen passing through them reaches air sacs called alveoli and is released into the bloodstream. Carbon dioxide from the blood collects in the alveoli and passes back through the bronchioles to be expelled by the lungs as you breathe out. The autonomic nervous system constricts and dilates the bronchioles. Strong arousal can provoke bronchiole constriction, which makes it more difficult to move air in and out of the lungs. As a result, stress and strong emotions such as fear or anger commonly trigger asthma attacks (bouts of breathlessness and wheezing) in some people who have asthma (see Figure 7). Of course, physical stressors, such as cold weather and exercise, can do the same.

The extent of the role stress plays in the development of asthma is still being debated. Intense family stress early in life has been proposed as one of several key risk factors. However, genetic predisposition, exposure to certain allergens, viral infections, and raised levels of certain allergy markers in the blood are also considered important.

## Stress and gastrointestinal disorders

According to an influential report published in *Gut* in 1999, a combination of psychological and physical factors can trigger gastrointestinal pain and other bowel symptoms. Severe life stress, it also noted, often precedes the onset of functional bowel disorders for patients in gastrointestinal clinics. Laboratory experiments show the digestive system responds to emo-

**Figure 7** Provoking an asthma attack



Stress can cause the small airways inside the lungs known as bronchioles to tighten. This constriction interferes with the flow of air into and out of your lungs. In people who are prone to asthma, this can trigger wheezing, breathlessness, and other symptoms of an asthma attack.

tional arousal and mental stress. Gastric acid secretion can increase, which may lead to heartburn and inflammation of the esophagus. Stress may play a role in the development of ulcers, too (see “Stress and ulcers,” at left). Stress can also cause abnormal contractions in the small intestine and colon and affect the pace at which food travels through the gastrointestinal tract.

Interestingly, the parasympathetic nervous system, which brings the body back to normal after the stress response occurs, is responsible for the change in colon contractions and the increase in gastric acid. Equally intriguing, the effect of stress on the gastrointestinal tract seems to differ from person to person. Irritable bowel syndrome (IBS), which is associated with stress, offers one example of such variation. IBS is characterized by abnormal contractions of the large and small intestines and abdominal discomfort with no apparent organic cause. Two English gastroenterologists found that when IBS patients were under stress, food moved more slowly through the small intestine in those patients who usually suffered from constipation. The opposite held true for those who typically had diarrhea.

A wide variety of triggers may cause IBS to flare up. Among them are a high-fat diet, certain hormones that affect the gastrointestinal tract, and everyday stressors, such as arguments or work pressures. Some research suggests that the early loss of one or both parents through death or divorce results in higher-than-average rates of IBS and peptic ulcer disease. ♥

# Developing your personal plan for stress relief

Having a personalized stress-relief plan can help you manage stressful situations better and even prevent stress from building in the first place. As you begin to create your personalized plan, go back for a moment to “My stress warning signs” (page 8), which helps you identify how stress affects you personally. Whenever you notice these symptoms, take a moment to do the following:

- **Stop and breathe.** Can you identify a specific stressful event?
- **Reflect.** What were your automatic thoughts? Write these down. Were there any distortions?
- **Choose.** Ask yourself: Is there another way to think about this situation? Can you use an affirmation? What steps can you take to reduce your stress level?
- **Notice how you feel now and write it down.** Congratulate yourself for coping with the situation better.

Remember to take one step at a time. The more you practice, the easier the process gets.

## My plan for stress management

KEY TASKS	THIS WEEK I WILL TRY	DAYS AND TIMES SET ASIDE	WHAT I NOTICED
Evoke the relaxation response through techniques such as deep breathing and a body scan (see “How to prevent and manage stress,” page 10).			
Nurture yourself by setting aside time for relaxation, eating well, exercising, connecting with others, and pursuing activities that add joy to your life (see “Nurturing yourself,” page 20).			
Change the pattern of how you appraise and respond to sources of stress through cognitive restructuring (see page 27). Stop, breathe, reflect, and choose.			

While the steps above can help you manage stress, you'll also want to apply the techniques you've learned in this report on a regular basis to keep stress at bay. You'll get the best results if you elicit the relaxation response every day for 10 to 20 minutes.

The chart on page 40 can help you start to do this by working these and other key components of an effective stress-management program into your daily routine. Practicing these techniques regularly may put you on the path toward a more peaceful, joyous, and healthy life.

Aim to try a variety of techniques, so that you can find the ones that work best for you. Let the first column of the chart refresh your memory of the primary techniques that help disarm the stress response. Then

decide what you're willing to try and when you can do it. Even small changes—pencil in a few mini-relaxations to break up daily tasks, reconnecting with a friend over lunch, or taking a mindful walk—are important steps toward your goal. By writing down what you noticed after taking these steps, you can encourage yourself to keep at it. Try your plan for one or two weeks before you make any changes.

What if you don't stick to the schedule you've drawn up? Try not to feel discouraged. Consider what got in the way and whether you set out to do too much. Ask yourself what strategies could help you circumvent these obstacles next week. Finally, embrace what felt good and find the opportunity to repeat it. ♥

## Glossary

**adrenaline and noradrenaline:** Also called epinephrine and norepinephrine, these key stress hormones cause a cascade of physiological responses in the body, such as faster heartbeat and respiration, a rise in blood pressure, and the release of energy-boosting fats and glucose.

**autonomic nervous system:** The part of the nervous system that rules such involuntary body functions as breathing, blood pressure, heartbeat, and the dilation or constriction of arteries and small airways in the lungs. Includes the sympathetic and parasympathetic nervous systems.

**breath focus:** A form of meditation that elicits the relaxation response; breath focus relies on deep, even breathing, a passive attitude, and a focus word or focal point.

**cortisol:** One of a class of stress hormones, called glucocorticoids, released by the adrenal glands during the stress response.

**focus words:** Words or phrases that enhance your sense of peace, relaxation, and connection while you practice deep breathing and other techniques that elicit the relaxation response.

**HPA (hypothalamic-pituitary-adrenal) axis:** A system that governs many hormonal activities in the body, including the stress response.

**hypothalamus:** A network of nerves, located above the brain stem, that helps control the sympathetic and parasympathetic nervous systems and, through the pituitary gland, the endocrine system. Sparks the stress response by releasing the first of several chemical messengers that put the body on alert.

**mindfulness:** A set of techniques that encourage you to slow your pace and live fully in the moment.

**mindfulness meditation:** An ancient Buddhist practice that induces the relaxation response by focusing you on the distracting thoughts and sensations that may occur during meditation; also called insight meditation.

**parasympathetic nervous system:** One of two offshoots of the autonomic nervous system; it calms body systems excited by the release of stress hormones.

**positive psychology:** An emerging field recognized by the American Psychological Association that focuses on identifying and promoting factors that allow people to thrive.

**post-traumatic stress disorder (PTSD):** A prolonged reaction to trauma characterized by recurrent flashbacks, dreams, or intrusive thoughts about the traumatic event; withdrawal from people and certain situations; being easily startled; and having difficulty sleeping.

**relaxation response:** A term coined by Dr. Herbert Benson to describe the physical effects of meditation and certain other techniques that are opposite to those of the stress response. Effects include marked drops in oxygen consumption, carbon dioxide expiration, heartbeat, and respiration, as well as stabilization or lowering of blood pressure.

**stress response:** Physiological changes, such as quickened breathing and heartbeat and increased blood pressure, brought on by stress hormones released in response to a real or perceived threat to your safety or ability to cope. Also called the fight-or-flight response.

**stressors:** Stressful events or circumstances that may be real or perceived threats to your equilibrium and well-being.

**sympathetic nervous system:** An offshoot of the autonomic nervous system; it cranks up the body when stress hormones are released in response to perceived or real dangers.

# Resources

## Organizations

### **Benson-Henry Institute for Mind Body Medicine at Massachusetts General Hospital**

151 Merrimac Street, 4th Floor  
Boston, MA 02114  
617-643-6090  
www.bhimgh.org

Home base to Dr. Herbert Benson (one of the medical editors of this report) and his colleagues, who have investigated the stress response and taught the relaxation response and other stress-management approaches for many years. The institute offers programs for people with various concerns and stress-related medical conditions, such as heart disease, chronic pain, cancer, or infertility. It also offers exercise, nutrition, wellness, and prevention programs, as well as school-based programs for children and young adults.

### **Center for Mindfulness in Medicine, Health Care, and Society**

55 Lake Ave. N.  
Worcester, MA 01655  
508-856-2656  
www.umassmed.edu/cfm

Founded by Jon Kabat-Zinn, author of *Full Catastrophe Living*, the center offers information and programs on stress reduction. Its clinical treatment program is affiliated with the University of Massachusetts Medical School.

### **National Center for Complementary and Alternative Medicine (NCCAM)**

NCCAM Clearinghouse  
P.O. Box 7923  
Gaithersburg, MD 20898  
888-644-6226 (toll-free)  
www.nccam.nih.gov

Part of the National Institutes of Health, this government agency offers a wealth of publications on a variety of health problems. It also sponsors valuable research on alternative and complementary medicine.

## Books

### **Harvard Medical School Guide to Lowering Your Blood Pressure**

Aggie Casey, M.S., R.N., and Herbert Benson, M.D.  
(McGraw-Hill, 2005, 256 pages)

Harvard Medical School experts present an innovative, proven plan to lower your blood pressure. In addition to offering nutrition and exercise advice, the book describes techniques that can help you manage your stress levels.

### **Mind Your Heart: A Mind/Body Approach to Stress Management, Exercise, and Nutrition for Heart Health**

Aggie Casey, M.S., R.N., and Herbert Benson, M.D., with Ann MacDonald  
(Free Press, 2004, 352 pages)

Offers a balanced and holistic approach to heart health that combines lifestyle changes with cutting-edge medical procedures. Discusses the importance of risk factors such as depression, anger and hostility, decreased social support, physical inactivity, and poor nutrition, and outlines self-care strategies to combat these problems.

### **The Relaxation Response**

(updated and expanded edition)  
Herbert Benson, M.D., with Miriam Z. Klipper  
(Avon Books, 2000, 240 pages)

A groundbreaking book that revealed the health benefits of stress-management techniques. This revised classic describes the therapeutic effects of the relaxation response and teaches a variety of methods to elicit it.

### **Self-Nurture: Learning to Care for Yourself as Effectively as You Care for Everyone Else**

Alice D. Domar, Ph.D., and Henry Dreher  
(Penguin Books, 2001, 320 pages)

Written for women, this book offers a prescription for enrichment and self-nurture techniques intended to revitalize your life and reconnect your body to your mind.







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| Arthritis            | Heart Disease          | Sexuality           |
| Back Pain            | Heart Disease and Diet | Skin Care           |
| Caregivers           | High Blood Pressure    | Sleep               |
| Cholesterol          | Incontinence           | Strength Training   |
| Depression           | Knees and Hips         | Stress Management   |
| Diabetes             | Living Independently   | Stroke              |
| Diabetes and Food    | Living Longer          | Thyroid Disease     |
| Energy/Fatigue       | Memory                 | Virus               |
| Erectile Dysfunction | Neck and Shoulder Pain | Vitamins & Minerals |
| Exercise             |                        | Weight Loss         |
| Eye Disease          |                        |                     |

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