

A HARVARD MEDICAL SCHOOL
SPECIAL HEALTH REPORT

Stress Management

Enhance your well-being by reducing stress and building resilience



PRICE: \$29



Copyright Notice

THIS REPORT IS COPYRIGHTED BY HARVARD UNIVERSITY AND IS PROTECTED BY U.S. AND INTERNATIONAL COPYRIGHT. ALL RIGHTS RESERVED.

Here's what you **CAN** do

- Print out one copy and route this “original” to family.
- You are permitted to have one copy of this publication on your computer at any time (you can't put it on a network unless you purchased a license to do so). If you have paid for more copies, then you may have that many copies on computers at any time.
- Copy, on an occasional basis, a couple of pages to give to friends, family members, or colleagues.
- We are registered with the Copyright Clearance Center (CCC). You can comply with the copyright laws by paying a royalty on copies you make of passages. But not even the CCC can authorize cover-to-cover photocopying or wholesale electronic forwarding.
- If you want to distribute copies of this publication, either in print or electronic form, to others on a regular basis, ask us about bulk discounts or licensing opportunities. You may be able to negotiate an agreement, for a single fee, that would enable you to legally distribute photocopies or electronic copies to others.

Here's what you **CAN'T** do (without prior permission)

- Make or forward email copies of an entire publication. The law provides for a very limited amount of copying, commonly referred to as “fair use.” However, cover-to-cover photocopying is forbidden.
- Electronic transmission of a copyrighted work is the legal equivalent of photocopying it (and so is posting it on the Internet or in an electronic database), and is therefore not allowed.
- Routinely copy and distribute portions.
- Republish or repackage the contents.

Some publishers must resort to lawsuits to protect their publications. Harvard Health Publications would like to eliminate the need for such suits by helping to educate customers. We hope this outline has helped explain what is legal and what is not.

For more information

Permissions Requests

Harvard Health Publications
www.health.harvard.edu/permissions

For Licensing, Bulk Rates, or Corporate Sales

Call 203-828-0349, or email us at
HHP_licensing@hms.harvard.edu, or
visit us at www.harvardhealthcontent.com

Harvard Health Publications

Harvard Medical School
10 Shattuck Street, 2nd Floor
Boston, MA 02115-6011
www.health.harvard.edu

STRESS MANAGEMENT

SPECIAL HEALTH REPORT

Medical Editor

Gregory Fricchione, MD

Director, Division of Psychiatry and Medicine

Director, Benson-Henry Institute for Mind Body

Medicine at Massachusetts General Hospital

Executive Editor

Anne Underwood

Writers

Francesca Coltrera, Julie Corliss

Copy Editor

Robin Netherton

Creative Director

Judi Crouse

Production/Design Manager

Lori Wendin

Illustrator

Scott Leighton

Published by Harvard Medical School

Gregory D. Curfman, MD, Editor in Chief

Urmila R. Parlikar, Senior Content Editor

In association with

Belvoir Media Group, LLC, 535 Connecticut Avenue, Norwalk, CT 06854-1713. Robert Englander, Chairman and CEO; Timothy H. Cole, Executive Vice President, Editorial Director; Philip L. Penny, Chief Operating Officer; Greg King, Executive Vice President, Marketing Director; Ron Goldberg, Chief Financial Officer; Tom Canfield, Vice President, Circulation.

Copyright © 2016 by Harvard University. Permission is required to reproduce, in any manner, in whole, or in part, the material contained herein. Submit reprint requests to:

Harvard Health Publications Permissions
10 Shattuck St., 2nd Floor, Boston, MA 02115
www.health.harvard.edu/permissions
Fax: 617-432-1506

Website

For the latest information and most up-to-date publication list, visit us online at www.health.harvard.edu.

Customer Service

For all subscription questions or problems (rates, subscribing, address changes, billing problems), email to HarvardProd@StrategicFulfillment.com, call 877-649-9457 (toll-free), or write to Harvard Health Publications, P.O. Box 9308, Big Sandy, TX 75755-9308.

Ordering Special Health Reports

Harvard Medical School publishes Special Health Reports on a wide range of topics. To order copies of this or other reports, please see the instructions at the back of this report, or go to our website: www.health.harvard.edu.

For Licensing, Bulk Rates, or Corporate Sales:
Call 203-828-0349, or
email HHP_licensing@hms.harvard.edu,
or visit www.harvardhealthcontent.com

ISBN 978-1-61401-130-9

The goal of materials provided by Harvard Health Publications is to interpret medical information for the general reader. This report is not intended as a substitute for personal medical advice, which should be obtained directly from a physician.

Contents

Understanding the stress response	2
What is stress?	2
Short-term stress: The positive side	4
Chronic stress: The downside	5
Tipping the balance: Resilience	6
The importance of stress management	7
Genes and the relaxation response	7
Cardiovascular disease	8
High blood pressure (hypertension)	10
Gastrointestinal disorders	11
Anxiety and depression	12
Diabetes	14
Cancer	14
Asthma	16
The different faces of stress	17
Adolescence and stress	17
Work and stress	18
Aging and stress	19
Caregiving and stress	19
What about stress in <i>your</i> life?	20
The relaxation response	23
Eliciting the relaxation response	23
Breath focus	25
Body scan	26
Guided imagery	27
Mindfulness meditation	27
Yoga, tai chi, and qigong	29
Repetitive prayer	30
Boosting your resilience	31
What is resilience?	31
Change your mindset	32
Exercise regularly	33
Eat well	34
Seek social support	36
Try positive psychology	37
Manage stress the “write” way, with a journal	38
Try cognitive restructuring	39
Learn to communicate better	41
Nurture yourself	42
SPECIAL SECTION	
Your portable guide to stress relief	44
Resources	52
Glossary	53



Dear Reader,

It's no surprise that most of us have stress in our lives. But some people are much better at coping with stress than others.

All of us have the same physiological response to stress: a rush of natural chemicals in the body instantly amplifies our strength and senses to help us take action. This swift reflex was encoded for our survival. Thanks to the stress response, you might jump out of the way of a speeding car or rush away from a burning building.

When the threat is real, the stress response can be lifesaving. But what happens when your body invokes the same set of responses to the types of daily stressors that are features of modern life? A steady drumbeat of chronic stressors—traffic jams, work deadlines, tight schedules, bills, and other worries—can erode your mental and physical health. Many studies link chronic stress to major killers like heart disease and stroke. Other common physical manifestations of stress include headaches, back pain, trouble sleeping, and irritable bowel disorder.

Fortunately, the strong connection between mind and body can work in your favor, too. This report will teach you stress management techniques, which fall into two broad categories: eliciting the relaxation response and building resilience. As its name implies, the relaxation response is designed to put your body in a calm, relaxed state—the opposite of the stress response. A host of different techniques, including meditation, yoga, and prayer, can evoke the relaxation response.

Resilience—a perhaps lesser known but equally important aspect of managing stress—refers to the ability to adapt to and recover from stress and other problems. It's not necessarily a trait that you either have or don't have, but rather a capacity that you can develop. In fact, practicing the relaxation response can help build resilience. I think of this as a simple ratio: stress is the top number (the numerator) and resilience is the bottom number (denominator). The more you reduce stress and increase resilience, the less vulnerable you will be to stress-related illnesses.

Often, we can't change the world around us. What we can change is how we perceive stressful situations and how resilient we are when faced with the minor and major troubles that arise in our lives, day by day, week by week. With the techniques described in this report, you can learn to manage stress through proven approaches that can enhance your health and happiness.

Sincerely,

Gregory Fricchione, M.D.
Medical Editor

Dr. Fricchione would like to acknowledge the work of Herbert Benson, M.D., and Aggie Casey, R.N., who wrote the original edition of this report.

Understanding the stress response

Stressful situations abound in our lives. Tornadoes, flash floods, and hurricanes upend lives across the country. News of economic woes and terrorist attacks seems to play in endless loops. Day-to-day hassles, like traffic jams and unpaid bills, may feel remarkably stressful, not to mention worries about work and family.

Stress is an unavoidable part of life—and too much of it can harm your mental and physical health. But you can learn to manage it successfully and, in the process, you can improve your well-being.

This report will highlight new research that shows just why stress management is such a powerful tool. Equally important, it will give you a smorgasbord of techniques for coping with stressful situations.

But before delving into solutions, it helps to understand just what stress really is, for while most of us deal with it on a daily basis, this is not the same as understanding what goes on inside the body during a stressful episode. This chapter delves into the stress response—that is, the so-called fight-or-flight response, which can be lifesaving in the case of an immediate physical threat, but harmful when stress becomes chronic.

What is stress?

We all encounter stress in our lives, though we might use different examples to describe it. You might define stress as bumper-to-bumper traffic, a looming deadline, a worrisome illness, or a contentious argument with your partner. A friend may define it as a relation-



Stress is not all in the mind. Your body has a set of physiological responses that evolved to help in emergency situations, in which you might have to fight or flee to safety. But these are not healthy when invoked on a daily basis, in response to ongoing stress.

ship spiraling downward or the need to care for an ailing parent.

If you were a medical expert, though, you would label these stressors—that is, examples of stressful events and circumstances. And you would define stress more specifically as an automatic physical response to such challenges, or indeed to any situation that requires you to adapt to change.

Whether the particular stressor you're confronting is a sudden car crash, a loud argument, or the

prospect of painful surgery, each potential or actual threat triggers a cascade of stress hormones that produce well-orchestrated physiological changes.

You know these sensations well: your heart pounds, muscles tense, and breathing quickens. But exactly how and why these reactions occur and what effects they might have when repeatedly evoked over time are questions that have intrigued researchers for years.

Harvard physiologist Walter B. Cannon was a pioneer in exploring the biochemistry of stress. A century ago, his research convinced him that fright was not all in the mind, but also involved a physical response. By experimenting with barking dogs and caged cats, Cannon was able to isolate a hormone secreted by the adrenal glands of cats when they were frightened. 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. Today we know it as the fight-or-flight response, or the stress response.

A look inside the stress response

Since then, scientists have learned a great deal more about the body's reaction to stress. It involves a series of hormones, the brain, and the autonomic nervous system, which rules involuntary body functions such as

breathing, blood pressure, and heartbeat. It's a complicated relationship, but one that's worth understanding.

Your response to threats begins in the thalamus, a part of the brain that receives and processes information from the senses—perhaps the sight of your boss wearing an ominous expression, or the sound of an explosion. Instantly, your thalamus alerts the brain's fear center, the amygdala, and other emotional centers of the brain, which then send signals to your motor cortex. From there, the message to respond speeds down nerve pathways to muscles, which tense and tighten, bracing for trouble.

Another signal comes from the hypothalamus, a portion of the brain perched above the brainstem. It relays the warning to the nearby pituitary gland, which sends a chemical messenger via the bloodstream to the adrenal glands, located above the kidneys. In response, the adrenal glands secrete a series of stress hormones, including the first hormone that Cannon isolated—epinephrine, commonly known as adrenaline. You're probably familiar with the so-called “adrenaline rush” that helps rev up your body.

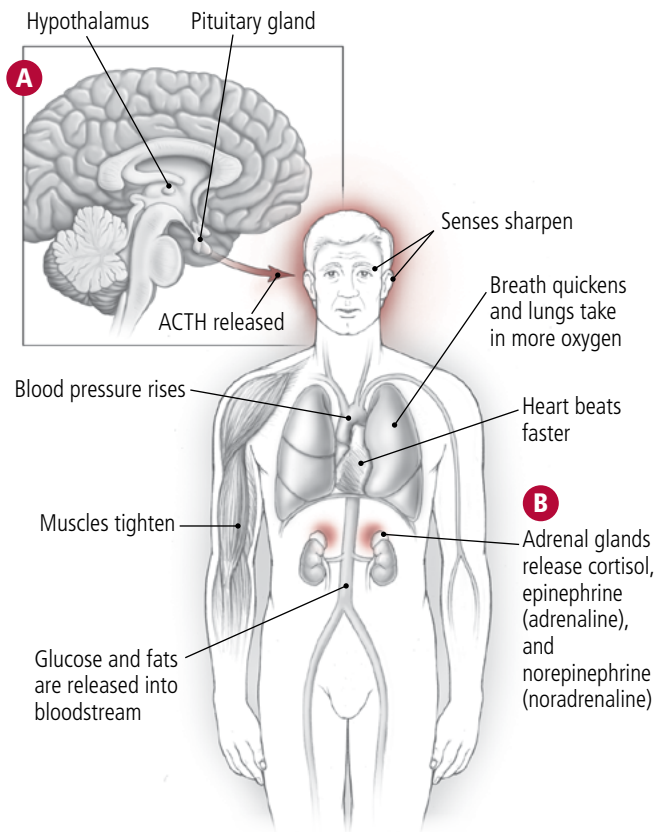
The adrenal glands also release a second stress hormone identified by Cannon, called norepinephrine, or noradrenaline. Other researchers added a third discovery—the stress hormone cortisol. When you're faced with a stressful situation, all three begin coursing through your bloodstream, producing a broad range of physiological responses (see Figure 1, at left).

Simultaneously, the hypothalamus fires up the autonomic nervous system. This network of nerves relays the warning down through the spinal cord and from there to nerves throughout the body. In response, nerve endings in organs, blood vessels, the skin, and even sweat glands release epinephrine and norepinephrine.

This tandem surge of hormones primes your body to react to the imminent threat. In the case of an immediate physical danger, such as the sudden appearance of a prowling wild animal or an armed enemy, you respond by either preparing to stand your ground and fight, or else fleeing to safety.

Your breath quickens as your body takes in extra oxygen to help fuel your muscles. Likewise, energy-boosting glucose and fats are released from storage

Figure 1: The stress response



Collectively, the hypothalamus, pituitary gland, and adrenal glands make up the HPA axis, which plays a pivotal role in triggering the stress response. The hypothalamus sends a chemical messenger (corticotropin-releasing factor, or CRF) to the nearby pituitary gland, which then releases its own chemical messenger (adrenocorticotropic hormone, or ACTH) into the bloodstream (A). ACTH travels to the cortical portions of the adrenal glands, which respond by releasing a number of stress hormones into the bloodstream (B).

At the same time, the sympathetic nervous system releases stress hormones, too (not shown). The combined effects of these hormones are widespread, as this illustration reveals. 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.

sites into your bloodstream. Sharpened senses, such as sight and hearing, make you more alert.

Your heart pounds—beating 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 to combat infection from anticipated wounds. 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 in order to focus energy where it's needed. The stomach and intestines dial back their operations. Sexual arousal lessens. Repair and growth of body tissues slows.

Defusing the stress response

Cannon believed the stress response was temporary. Minutes after the rush triggered by epinephrine, he

Are you stressed right now? Try this

You may not even realize it if you're stressed. A few quick body checks can help you tell:

- ✓ **Are you breathing shallowly?** Put one hand on your chest and the other on your belly. When you breathe in and out, pay attention to which hand is moving. Calming breaths draw air deep into your lungs, so that your chest and belly expand; shallow, tense breaths involve only your chest.
- ✓ **Are your neck and shoulders tense?** Take a deep breath. As you breathe out, slowly roll your shoulders up toward your ears, back, and down, relaxing them as much as possible. Are your shoulders lower than they were a moment ago?
- ✓ **Are you clenching your jaw or your fists?** Take a deep breath, then relax your jaw until your lips are slightly parted. Take another deep breath and relax your hands so that your fingers are loosely parted.

For a more complete list of stress warning signs, see "My stress warning signs," page 21. Then try the relaxation response techniques (see "The relaxation response," page 23). You'll be surprised at how thoroughly relaxed your body can feel.

thought, a person's body would wind down to its normal state of balance, known as homeostasis. The lungs would slow their rate of breathing. Blood pressure would drop as the heartbeat slowed and blood flowed in normal patterns again. The intestines would resume their work, providing new fuel to replace the energy burned in the emergency. Bone and skin cells would resume repairs or grow again, as needed. Sex might appear more inviting.

Later research showed, however, that Cannon was not completely correct. Often, the effects of stress linger for an extended period of time, or may even compound so that the body never completely unwinds.

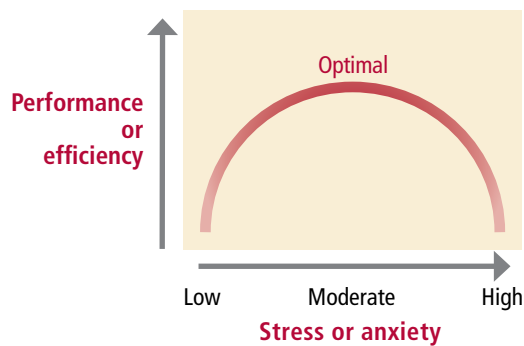
The autonomic nervous system, which governs these responses, is actually divided into two parts with opposite effects. The sympathetic nervous system revs up the body in response to perceived dangers, as described above. Its counterpart, the parasympathetic nervous system, calms the body after the danger has passed. But in today's society, stressors often pile up one after another in a combination of traffic jams, deadlines, money woes, and a host of other challenges that fill our days rather than passing rapidly, like the wild animal that eventually lumbers away. As a result, the sympathetic system often remains engaged long after it should have yielded to the soothing influence of the parasympathetic system. The results can be damaging in many ways, as the next chapter will explain.

Even faced with chronic stress, however, you can benefit from stress management techniques. Regular use of these techniques can help you tamp down the sympathetic nervous system when it is not truly needed and restore balance.

Short-term stress: The positive side

Not all stress is bad. As many people have noted, the stress response can be enormously helpful in times of physical danger or when it's vital to carry out an urgent task. Surging epinephrine (adrenaline) enables people to perform Herculean feats. Abundant proof of this can be seen in the deeds of first responders who act swiftly to help others during dangerous weather events or terrorist-related incidents.

Figure 2: The ups and downs of stress



Researchers Robert M. Yerkes and John D. Dodson showed that as stress increases, performance rises to an optimal point, but if stress continues to increase, eventually performance and efficiency decline. This is known as the Yerkes-Dodson law.

The stress response is appropriate and essential in such overwhelming situations and can help you 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.

But the stressors in our lives are not always physical dangers. Physiologist Hans Selye advanced the idea that psychosocial stressors like a pressing work deadline or a heated family argument can trigger the same physiological response as a bodily threat. In the short run, this can be beneficial. Selye explored the difference between short-term stress that stimulates people to summon the resources to hurdle obstacles (“good” stress, or eustress) and ongoing or overabundant stress, which wears down our ability to adapt and cope (“bad” stress, or distress).

Two Harvard researchers, Robert M. Yerkes and John D. Dodson, also showed that a jolt of stress isn’t necessarily bad. It can help with non-Herculean tasks like finishing a difficult project or juggling a tight schedule. They noted that as stress or anxiety levels rose, so did performance and efficiency—up to a point (see Figure 2, above). Once this optimal point was reached, however, further stress and anxiety led to significant declines in performance and ability.

Where the 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 it. Research has identified characteristics common to stress-hardy folks. Exercise and social support are essential. So are control, challenge, and commitment. Stress-hardy people seem to feel a sense of control or the ability to influence events. They embrace the challenge in situations others might find stressful and describe themselves as committed to something meaningful. They report fewer illnesses and are less likely to be absent from work.

Chronic stress: The downside

Intuitively, the classic stress response makes sense. It enables you to rise to occasions that reward heightened awareness and abilities. You hear a tree limb crack above you while sheltering from a storm, and the surge of epinephrine helps you sprint out of its path far faster than you normally move. The stress hormones that spilled into your bloodstream found the perfect physical outlet.

But experience tells us obvious dangers are not the only scenarios that elicit the stress response. Any situation you perceive as a hassle or a threat to your well-being may trigger it, too, especially if a lightning-quick assessment suggests that you don’t have the resources to cope with it. And that’s where 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 computer meltdowns 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 when, say, layoff rumors fly or medical test results are delayed. Without realizing it, you might make assumptions about whether you’ll be laid off or what the test results will show, setting off another cycle of physiological symptoms—such as a clenched jaw, tight neck and shoulders, and anxiety.

When your body repeatedly experiences the stress response, or when arousal following a terrible trauma is never fully switched off, your body's stress response can be described as maladaptive, or unhealthy. In this situation, the stress response kicks in sooner or more frequently than normal, increasing the burden your body must handle. This can lead to worrisome health problems. A prime example is high blood pressure—a major risk factor for coronary artery disease.

Tipping the balance: Resilience

It's impossible to sidestep all sources of stress. Would you really want to, anyway? Our lives are full of physical and psychological challenges that add zest to life and sometimes deliver satisfying rewards. But while you can't easily erase all sources of stress, you can learn to perceive and handle them differently. In this report, you will learn how to reduce stress and also build resilience—your ability to bounce back from stress.

William James, the great Harvard philosopher-psychologist of the late 19th century and a graduate of Harvard Medical School, himself a stressed-out melancholic, marveled at those he called “the healthy-minded” among us because they appeared to live happier and healthier lives as a result of their optimism and positive perspective on life. Amid the run-of-the-mill volatility everyone must deal with, the healthy-

minded seemed to turn challenges and potential failures into grist for opportunities and successes.

More recently, Nassim Nicholas Taleb updated this notion in a 2014 book called *Antifragile: Things that Gain from Disorder*. Taleb defines fragility as the tendency to be damaged by volatility and uncertainty—the kinds of things that often create a chronic stress response. By contrast, the antifragile person realizes that stress is just the price we pay for being alive. Cultivating antifragility allows us to use our various strengths to overcome challenges and become stronger in the process.

Research involving Navy Seals reveals that they are generally antifragile. By and large, they are able to manage high degrees of stress and still function admirably. Studies using functional magnetic resonance imaging (fMRI), which maps activity in the brain in real time, show that Seals, rather than responding to a stressor with a physiological overreaction, are able to rapidly change the focus of their attention and address the issue at hand efficiently and flexibly. This was reflected in altered activation of a prefrontal brain region called the insula, which is involved in managing stress signals. As a group, Navy Seals exhibit at least seven characteristics of resilient people—calm, innovative, nondogmatic thinking; the ability to act decisively; tenacity; interpersonal connectedness; honesty; self-control; and optimism and a positive perspective on life. ♥

The importance of stress management

Skeptics have long believed that meditation and other stress reduction techniques are nice but ineffectual practices that do little for you. Nothing could be further from the truth—and now we have the science to prove it.

There is little doubt that chronic stress has harmful effects on the body, and it acts in multiple ways. To begin with, the ripple effects of stress undermine healthy behavior. If you've ever powered your way through a taxing day on a fistful of candy bars and cigarettes, you understand the issue firsthand. But over and above such impacts on behavior, stress affects the body directly.

Abundant evidence shows that chronic stress chips away at physical health, pushing blood pressure to dizzying heights and harming the heart. It plays a role in diabetes, asthma, and gastrointestinal disorders. High levels of stress may even speed up the aging process.

By contrast, people exhibiting less stress tend to be in better health, and now we're starting to understand why. Stress management can benefit the entire body, right down to your genes.

Genes and the relaxation response

In 2013, researchers at the Benson-Henry Institute for Mind Body Medicine at Massachusetts General Hospital released results from a study showing that the simple act of eliciting the relaxation response temporarily changes the activity of certain genes in ways that may benefit health. For starters, it reduces the activity of genes associated with chronic inflammation. Many experts believe these inflammatory responses stress the body, possibly contributing to a host of chronic ailments, such as heart disease, inflammatory bowel disease, and diabetes.

At the same time, the relaxation response boosts the activity of genes linked with a variety of beneficial

Far from being a nice but ineffectual practice, meditation can have physical effects on your body, right down to your genes.



functions: the use of energy in the body, the release of insulin (which helps regulate blood sugar), the maintenance of telomeres (protective end-caps on our chromosomes that erode with age), and the functions of tiny cellular powerhouses called mitochondria. The latter may create energy reserves that help the body counter oxidative stress—the damage caused by highly reactive molecules called free radicals.

The study involved two small groups of healthy people: long-term practitioners of techniques like yoga, meditation, and repetitive prayer that elicit the relaxation response, and novices who hadn't used these techniques. The novices were tested initially after listening to a health education tape; these results provided a basis for comparison. They then learned a sequence of relaxation response techniques, which they practiced for 20 minutes a day, guided by a CD, over eight weeks. This sequence included deep or abdominal breathing (also known as breath focus), body scan, mantra repetition, and mindfulness meditation (for descriptions of these types of techniques, see "The relaxation response," page 23).

Health problems linked to stress

Stress may contribute to or exacerbate health problems from A to Z (or at least to U). Among them:

- allergic skin reactions
- anxiety
- arthritis
- constipation
- cough
- depression
- diabetes
- dizziness
- gum disease
- headaches
- heart problems, such as angina (chest pains), arrhythmias, heart attack, and palpitations (pounding heart)
- heartburn
- high blood pressure
- infectious diseases, such as colds or herpes
- insomnia and resulting fatigue
- 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
- Parkinson’s disease
- postoperative swelling
- premenstrual syndrome (PMS)
- side effects of AIDS
- side effects of cancer and cancer treatments
- slow wound healing
- ulcers.

To the extent that stress worsens these ailments, the relaxation response (a state of profound rest) and other stress management methods can be healing.

Adapted from The Relaxation Revolution, Herbert Benson, M.D., and William Proctor, J.D. (Scribner, 2010).

Researchers obtained blood samples for genetic testing from the groups immediately before a single relaxation response session, immediately afterward, and 15 minutes afterward. While the long-term practitioners showed the most profound changes in gene activity, the group with eight weeks of training also experienced significant changes in gene activity compared with results they’d posted as complete novices.

These results built on a 2008 study that also found changes in the activity of genes after practicing the relaxation response. Once again, greater changes were seen in the long-term practitioners than in the novices. It’s important to note, though, that gene activity isn’t altered forever by yoga or repetitive prayer. One lesson gleaned from this research is that the relaxation response must be elicited regularly in order to make beneficial changes persist.

Do similar changes occur in people who use relaxation response techniques to help treat stress-related illnesses? Studies on people with hypertension and inflammatory bowel syndrome have found changes in gene expression. They’ve also found that relaxation practice produces positive effects on health—blood pressure reductions in the first case, improvement in pain ratings and quality of life in the second.

Cardiovascular disease

Cardiovascular disease encompasses a range of ailments that affect the heart or blood vessels. Chronic stress contributes to three of the most common ailments: atherosclerosis (the accumulation of fatty deposits on artery walls), heart attacks, and high blood pressure. Stress can also trigger atrial fibrillation, palpitations, premature ventricular contractions, and other arrhythmias (abnormal heart rhythms). An intense physical or emotional experience—such as surgery or the death of a loved one—can cause an uncommon condition known as stress cardiomyopathy (see page 9).

Many psychological factors—including depression, anxiety, anger and hostility, and loneliness—contribute to stress. So do social factors, such as challenges related to work, family, and finances. Acting alone, each of these factors heightens the chances of developing heart trouble. When combined, their power increases exponentially.

One three-year study asked 2,700 American adults to complete an online survey of physical and mental health following the terrorist attacks of Sept. 11, 2001. 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 other heart problems during the following two years compared with those who had low stress levels.

Even our perceptions about how stress affects us may be harmful, according to a study tracking 7,200 British men and women. People who believed stress had affected their health “a lot or extremely” were twice as likely to die from heart disease or have a non-fatal heart attack, compared with those who reported stress was not harming them.

Stress may contribute to cardiovascular disease in several ways. The release of stress hormones, such as cortisol and epinephrine, into the bloodstream stimulates the release of triglycerides and other fats that can cause levels of unhealthy LDL cholesterol to rise. In addition, when the sympathetic nervous system is aroused, blood pressure rises and platelets become stickier (see “A look inside the stress response,” page 3). 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.

Chronic inflammation—known to play a key role in the development of heart disease, and apparently worsened by chronic stress—is another possible player. Inflammation serves many useful functions: it defends the body against bacteria, viruses, and other foreign invaders, removes debris, and helps repair

damaged tissue. Inside arteries, however, chronic low-grade inflammation contributes to atherosclerosis. Atherosclerosis in turn can narrow blood vessels dangerously, causing chest pain, a heart attack, or a stroke. Chronic inflammation even influences the formation of artery-blocking clots, the ultimate cause of heart attacks and many strokes.

Stress has indirect influence, too, when negative emotions shape behaviors that affect cardiovascular risk. For example, people who are stressed are more likely to smoke, eat unhealthy food, and be sedentary.

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

Can stress management help?

Yes. The strongest evidence for the benefits of stress management springs from heart disease studies. One Medicare-sponsored study published in the *American Heart Journal* examined two nationally recognized programs—the Cardiac Wellness Program of the Benson-Henry Institute for Mind Body Medicine and the Dr. Dean Ornish Program for Reversing Heart Disease. Both programs aim to improve heart health through lifestyle modifications, including stress man-

Stress cardiomyopathy: A different kind of heart attack

Classic heart attack symptoms—severe pressure, heaviness, or pain in the chest—most often arise from a blockage in a coronary artery that prevents blood from reaching the heart muscle. But in the 1990s, Japanese doctors began describing an unusual type of heart attack that did not involve a blocked artery.

Typically, the heart muscle takes on an unusual appearance during one of these episodes. The tip of the left ventricle (the heart’s main pumping chamber) balloons out, while the base contracts. Because this shape resembles the shape of a takotsubo, the traditional clay pot Japanese fishermen use to trap an octopus, the condition initially took on this name. In more recent years, the disorder has been dubbed stress cardiomyopathy—or more informally, broken heart syndrome, because it is often

triggered by an intense physical or emotional experience, such as surgery or the death of a loved one.

It’s not entirely clear why the heart takes on this peculiar shape. But physicians believe the surge of stress hormones essentially stuns the heart muscle, altering the cells and preventing the heart’s left ventricle from contracting effectively. The symptoms are indistinguishable from a normal heart attack. The condition is far more common among women, mostly ages 50 or older.

Treatment typically includes medications known as beta blockers and ACE inhibitors, which are sometimes taken even after the symptoms subside, with the idea that these drugs may temper surges of stress hormone. It’s possible—but not proven—that meditation or another relaxation technique might help prevent a recurrence.

agement, exercise, and nutrition counseling. At the end of the three-year study, participants (who all had heart disease at the outset) had lost weight, reduced their blood pressure levels, improved cholesterol levels, and reported greater psychological well-being. Both programs also appeared to improve cardiac function. What's more, participants in the Benson-Henry program also had lower death rates and were less likely to be hospitalized for heart problems, compared with controls.

Even after you've had a heart attack or heart surgery, stress management can help by bolstering the benefits of cardiac rehabilitation—a supervised program to help people recover after such an event. In a 2016 study published in the journal *Circulation*, researchers compared three groups of heart patients. One group chose not to participate in cardiac rehab at all. A second group did cardiac rehab for 12 weeks, and a third did cardiac rehab plus stress management—specifically, a program of weekly 90-minute sessions that included small group discussions and training in stress reduction, coping skills, and relaxation techniques. After three years, those in the combined pro-

gram had an 18% rate of cardiac events (heart attacks, strokes, recurrent chest pain requiring hospitalization, and death)—versus 33% for those in standard rehab and 47% for those who opted out entirely.

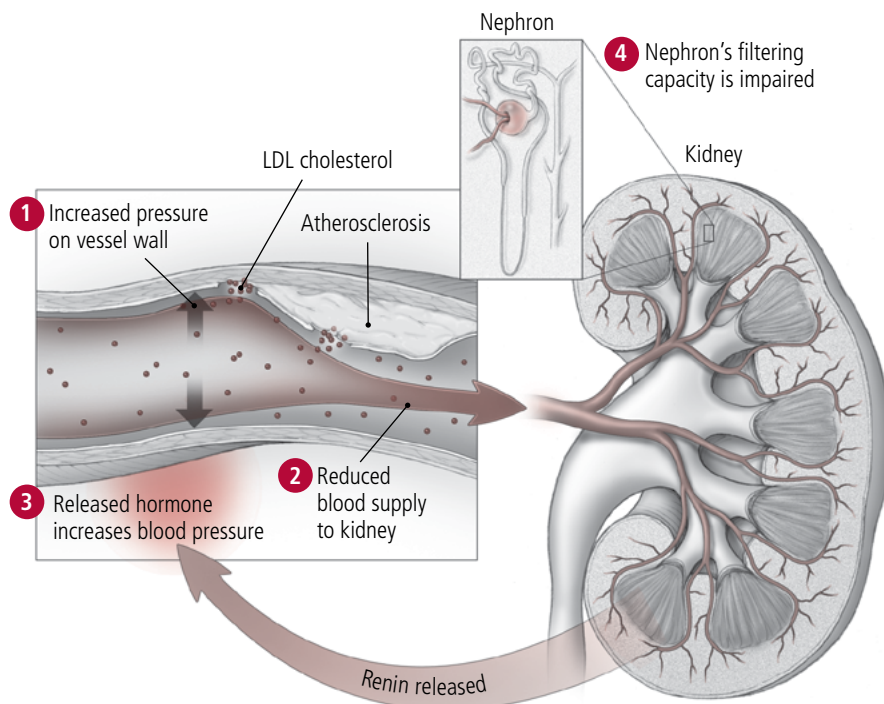
High blood pressure (hypertension)

Stress management seems to be especially effective for lowering high blood pressure. Blood pressure fluctuates throughout the day, spiking when you exercise or get upset and dipping when you rest quietly or sleep.

The release of stress hormones causes your heart to beat faster and your blood pressure to rise. Often, this increase 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 forces the heart to pump harder to circulate blood, which eventually causes heart muscle to thicken. But in the heart, a bigger muscle doesn't necessarily translate into added strength. Often the blood supply to the heart muscle doesn't increase to the same degree, and, over time, the heart

Figure 3: High blood pressure and kidney damage



Stress can contribute to high blood pressure, setting the stage for atherosclerosis and sometimes kidney damage. High blood pressure causes 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.

weakens, becoming less effective as a pump—a condition known as heart failure.

High blood pressure also damages artery walls in a way that promotes atherosclerosis. In fact, the higher your blood pressure, the greater your risk for a heart attack, heart failure, stroke, and even kidney disease (see Figure 3, page 10).

Can stress management help?

Yes. Eliciting the relaxation response helps lower blood pressure. A variety of techniques are effective. For example, according to a 2013 scientific statement from the American Heart Association, a number of studies show that meditation can modestly lower blood pressure. One report, which pooled results from nine studies, looked at the effects of transcendental meditation, a technique in which you repeat a mantra—a word, phrase, or sound—to quiet your thoughts and achieve greater awareness; it's one of many different strategies that can evoke the relaxation response. The analysis found that on average, transcendental meditation lowered systolic blood pressure by 4.7 mm Hg and diastolic blood pressure by 3.2 mm Hg compared with other approaches, which included health education, relaxation, or no treatment.

Practicing the relaxation response may even lessen the amount of medication you need to take to control your blood pressure, according to one randomized, controlled trial of older adults on an eight-week program of relaxation response plus other stress management techniques. One way it helps may be by increasing levels of nitric oxide in the blood (see “The relaxation response and nitric oxide,” page 14).

Gastrointestinal disorders

The gastrointestinal system is very sensitive to emotions—and anger, anxiety, sadness, and elation can all trigger symptoms in the gut. That's not surprising when you consider the close connection and similarities between the nerves in the brain and the gut. The gut is controlled by the enteric nervous system, a complex system of about 100 million nerves that oversees every aspect of digestion and is strongly influenced both by the central nervous system (the brain and spinal cord)

Stress and ulcers

Doctors used to advise people with ulcers to eat bland foods and try to avoid stress. 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, at least partway.

As it turns out, many people infected with *H. pylori* don't develop ulcers, suggesting that other factors, such as stress, play important roles. 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.

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 have implications for ulcers, even those created by bacteria. One well-known 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 given during summer vacation.

Stress might affect ulcers in other ways, too. It may trigger more stomach secretions, which increase inflammation and lessen the body's ability to buffer stomach acids.

and by the gut microbiome—an extensive ecosystem of microbes that inhabit your gastrointestinal tract.

Over a decade ago, an influential paper published in the journal *Gut* reported that a combination of psychological and physical factors can trigger gastrointestinal pain and other bowel symptoms. Severe life stress, the report also noted, often precedes the onset of functional bowel disorders for people being treated in gastrointestinal clinics. Laboratory experiments show the digestive system responds to emotional arousal and mental stress. Stomach 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,” above). Stress can also cause abnormal contractions in the small intestine and colon and influence the pace at which food travels through the gastrointestinal tract. Moreover, it affects the permeability of the intestines and regeneration of a layer of cells called the mucosa, which helps defend the body against pathogens—and stress also harms the beneficial bacteria that contribute to a healthy gut.

The parasympathetic nervous system, which brings the body back to normal after the stress response occurs (see “Defusing the stress response,” page 4) is responsible for the change in colon contractions and the increase in stomach acid. Two English gastroenterologists found that when people with irritable bowel syndrome (IBS) who usually suffered from constipation were under stress, food moved more slowly through the small intestine. The opposite held true for those whose IBS typically took the form of diarrhea.

A wide variety of triggers may cause IBS to flare up. Among them are a high-fat diet; alcoholic or caffeinated drinks and drinks that use a lot of artificial sweeteners; stress 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.

Can stress management help?

Quite possibly, yes, if you suffer from IBS. Along with IBS medications, dietary changes, exercise, and probiotics, the National Institute of Diabetes and Digestive and Kidney Diseases recommends trying stress management strategies, such as meditation and mindfulness, hypnotherapy, cognitive behavioral therapy, and other forms of psychotherapy.

A study that was published in the *American Journal of Gastroenterology* randomly assigned 75 women with IBS to eight weekly sessions plus an intensive half-day of mindfulness training, or to a support group. Immediately after treatment and at the three-month follow-up, mindfulness participants reported a much greater reduction in bowel symptoms than women in the support group. Measures of quality of life, psychological distress, and anxiety stemming from gastrointestinal sensations didn’t change immediately for either group, yet were better at the three-month follow-up for the mindfulness participants. Not all studies agree that mindfulness training affects IBS symptoms, however.

Another promising stress management tool for people with IBS is cognitive behavioral therapy (CBT; see “Try cognitive restructuring,” page 39). One recent

study compared the effects of 10 weeks of Internet-based CBT techniques guided by online therapists versus being on a waiting list. One aim of the therapy was to break the negative cycle linking avoidance behaviors, severity of symptoms, and impaired function (for example, avoiding work meetings or public transportation when feeling abdominal pain because of fear of losing bowel control). While treatment effects were small, CBT delivered via the Internet was indeed effective for some people.

In a study looking at the effects of the Stress Management and Resilience Training (SMART) program (see “Better health through resilience training?” on page 33), people with both inflammatory bowel disease and irritable bowel syndrome had fewer pain complaints and better quality of life. Their blood samples also showed evidence of changes in the expression of certain genes that control inflammation. These changes may play a role in counteracting the harmful effects of stress in both conditions.

Talk to your doctor about tailoring a program that will best fit your situation.

Anxiety and depression

Stress feeds negative emotions like anxiety and depression. And, in turn, anxiety and depression may boost feelings of stress. Broadly speaking, depression may be sparked by thoughts of loss—a job layoff, a divorce, or a death, for example—and anxiety is typically tied to fear of the unknown.

Even when a clear threat to your well-being forms the springboard, anxious or depressive thoughts often spiral into a series of perceived threats, spinning off into increasingly distorted worries. A cancer diagnosis morphs instantly into a death sentence. The traffic jam that caused you to miss a meeting becomes an iron-clad reason for your boss to fire you.

If your anxiety is severe enough to interfere with daily life, talk to your doctor or seek counseling on your own. 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

Post-traumatic stress disorder (PTSD)

Imagine this: You're a soldier on leave walking down a city street with your family. You notice an ominous grouping of trash cans out of the corner of your eye, or maybe a truck driving toward you backfires loudly. Before you know it, you've launched yourself at your children, knocking them to the ground to take cover from the explosion. Like a rubber band, the sights and sounds snapped you back to your trained response to IEDs—improvised explosive devices—in a combat zone.

Traumatic experiences often scar the psyche. Many military personnel who have been in combat suffer post-traumatic stress disorder (PTSD). According to the National Center for Posttraumatic Stress Disorder, 12% of veterans of wars in the Persian Gulf, Iraq, and Afghanistan have PTSD in a given year. And as many as 30% of Vietnam veterans have experienced PTSD at some point.

Other traumatic events—such as rape, physical assault, accidents, natural disasters, witnessing acts of terrorism, living in a war zone or otherwise violent locale, losing a loved one suddenly, or even having a heart attack—may also trigger PTSD. A national survey estimated that 5% of men and 10% of women will experience PTSD during their lifetimes. The risk is higher among people with a family history of depression.

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 others and resuming normal life may provide solace. Physical activity and expressing emotions while concentrating on the future may also prove useful. Eliciting the

relaxation response regularly, or using other stress management tools, can help, too. Our “blue dot” exercise, a visual reminder to engage in frequent mini-relaxations when faced with situations likely to set off a stress reaction, may help keep you on a calmer track (see “Blue dots,” page 27).

If stress symptoms in response to a trauma last for over a month or if PTSD symptoms disrupt your life or affect you for more than a few weeks, seek help from a licensed mental health professional. Keep in mind, too, that sometimes symptoms don't occur until six months or more after the triggering event.

Key symptoms of PTSD include the following:

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

- frequent physical symptoms—such as agitation, shakiness and trembling, nausea, hot and cold flashes, dizziness, headaches, shortness of breath, or frequent urination—in the absence of a rational threat
- recurring distressing thoughts and uncontrollable repetitive behaviors intended to reduce the anxiety triggered by those thoughts.

Likewise, it's important to seek help from your doctor or a mental health professional 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.

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

Can stress management help?

Yes. A 2014 review article in *JAMA Internal Medicine* found that mindfulness meditation (see page 27) can help ease anxiety and depression, though the effects aren't always easy to document. The researchers reviewed a staggering 19,000 meditation studies and found just 47 that met their strict criteria for a well-designed study. (Many studies don't include a good control treatment to compare with meditation, and many people who volunteer for meditation studies are already sold on its effects, so they're more likely to report positive effects.)

That said, mindfulness is thought to be especially helpful for quelling anxiety, as it can help quiet the distracting, unproductive thoughts that fuel worry and anxiety by focusing the mind on the present in a nonjudgmental way. Yoga may also help, though more study is needed.

Please note that it's also important to seek advice from a licensed mental health professional. After eval-

uating you, he or she may recommend a combination of medications and counseling, as well as a mind-body program or other stress management approaches.

Diabetes

Nearly 26 million Americans are estimated to have diabetes. Some know it; some don't. The vast majority—90% to 95%—have type 2 diabetes, which is often triggered by obesity, poor diet, and inactivity. Another 79 million Americans are skating close to that edge with higher-than-normal blood glucose (sugar) levels, a condition called prediabetes.

While chronic stress isn't thought to cause diabetes, it can make blood sugar harder to control, a problem that compounds if you're using unhealthy behaviors to relieve pressure (see "Healthy vs. unhealthy responses to stress," page 20). Keeping blood sugar levels within certain parameters set by your doctor can help you prevent, or slow down, the many complications that stem from diabetes. Heart disease (the No. 1 cause of death in people with diabetes), nephropathy (kidney damage or disease), and psychosocial distress (depression, negative outlook, and similar issues) are among them.

Can stress management help?

Possibly. The best evidence so far is for the effects of yoga on type 2 diabetes. A 2016 review in the *Journal of Diabetes Research* that pooled findings from 25 different trials suggests that yoga may help improve blood sugar control, lipid levels (such as cholesterol and triglyceride levels), and body composition, including a reduction in fat leading to weight loss.

Meanwhile, the Heidelberg Diabetes and Stress Study (HEIDIS), a five-year randomized, controlled trial of 110 people with type 2 diabetes, is looking at the effects of an eight-week mindfulness-based stress reduction program that

included meditation and a component aimed at handling difficult thoughts and feelings about diabetes. After six months, the mindfulness participants took part in a booster session. Thus far, first-year results show no effect on a key biomarker for kidney damage, but the mindfulness group had lower diastolic blood pressure and less distress and depression than the controls.

A similar study, known as DiaMind, found that mindfulness-based stress reduction helped reduce emotional distress and improved quality of life in people with diabetes who had low levels of emotional well-being. The intervention did not help participants improve their blood sugar control, however. So for now, it's too soon to say whether a broad program of stress management can help people with diabetes gain better control of their illness.

Cancer

Cancer is not a single disease, but many diseases. What they have in common is the uncontrolled spread of abnormal cells. Currently, there is no evidence to suggest that stress by itself causes cancer. But whether long-term stress may change a tumor's microenvi-

The relaxation response and nitric oxide

Relaxation response techniques may boost the body's production of nitric oxide, a substance present in human tissues that offers a variety of health benefits. Nitric oxide acts as a signaling molecule. It enables key body systems to communicate, dampens the activity of certain immune cells, and inhibits blood clotting. One of its most important effects is to dilate blood vessels, which helps keep blood pressure under control.

That's not all it does. Nitric oxide also has antibacterial and antiviral properties. It stimulates 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. Having sufficient levels of nitric oxide may offer protection against microbes, health problems such as high blood pressure, and overzealous activity in the immune and vascular systems.

In one study, researchers measured oxygen consumption and nitric oxide exhalation in participants at the start of the trial, then again after eight weeks of training in evoking the relaxation response. 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 control group showed no such change.

ronment and 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. Since chronic stress can hamper certain types of immune response, this might affect the body's ability to head off the uncontrolled proliferation of cancerous cells.

Can stress management help?

It's too early to say, but there are promising hints. In 2008, Dr. Dean Ornish, president of the Preventive Medicine Research Institute in Sausalito, Calif., published a pilot study in the *Proceedings of the National Academy of Sciences*. The study participants were 30 men with early-stage, nonaggressive prostate cancer who had opted for "active surveillance" of their condition rather than medical treatment. They all agreed to go on Dr. Ornish's program, which combines a healthy low-fat diet with exercise, stress reduction techniques, and increased social support (which also reduces stress and boosts resilience).

After three months, an oncologist analyzed biopsy tissue taken from each of the men upon diagnosis and compared it with a second tissue sample taken after the three-month program. There were major changes in gene expression—that is, the activity of various genes. Across the board, the changes were of the type that can help protect against cancer and other major diseases. A total of 48 protective genes had become more active, including the "secreted frizzled-related protein" gene, which is a tumor suppressor. By contrast, 453 genes that promote inflammation, heart disease, and cancer were tamped down, including the RAN and SHOC2 genes, which are classified as tumor promoters. It was the first time anyone had shown that lifestyle changes may have beneficial effects on the genes involved in cancer. However, it's not possible to tell how great a role any of the four lifestyle interventions played individually. And of course, it's a long way from there to concluding that stress management can help prevent either the initiation or pro-

Can stress reduction slow aging?

Telomeres are structures on the ends of chromosomes that protect a cell's genetic information from damage. As cells replace themselves over the course of a person's life, the telomeres in each generation of cells become shorter. Eventually these structures are too short to be protective, leaving the cells vulnerable to damage and death. However, some people have shorter telomeres than their age alone would warrant, essentially meaning their bodies are aging faster. Stress appears to be one factor involved in this acceleration: several small studies have found that people with high stress levels (such as people with post-traumatic stress disorder or people caring for a chronically ill child or a family member with dementia) have shorter telomeres compared with matched controls.

Research suggests that learning to manage stress may help repair shortened telomeres. One pilot study found that after five years of following Dean Ornish's program, which includes a low-fat diet, exercise, stress reduction, and social support, 10 participants showed an average 10% lengthening of their telomeres—versus a 3% shortening in 25 people not following the program. Furthermore, there was a "dose-response" effect, meaning that the greater the degree of healthful lifestyle changes participants made, the greater the increases in their telomere length. There are also hints that the activity of telomerase (an enzyme that maintains telomere length) increases with mindfulness training and declines with chronic stress and obesity.

gression of cancer. Many more studies of greater size are needed.

In 2015, the Benson-Henry Institute for Mind Body Medicine began a study of people with symptomless changes in blood cells that sometimes progress to multiple myeloma, a cancer that affects plasma cells. Certain gene changes found in multiple myeloma appear to be the opposite of gene changes that occur when healthy people elicit the relaxation response regularly. Thus, it's possible that the relaxation response might have beneficial effects on the tumor microenvironment pathways altered by multiple myeloma. Results from the study are expected in early 2017.

In the meantime, stress management could help people deal with some of the emotional and physical effects of cancer. According to the National Center for Complementary and Alternative Medicine, practicing mindfulness meditation can help relieve

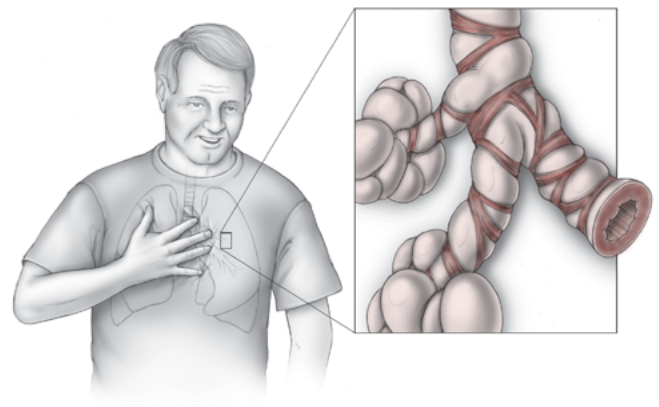
anxiety and stress in people with cancer, as well as ease fatigue and overall mood and sleep disturbances. And a small pilot study of men receiving radiation treatment for prostate cancer found that those who were anxious before the radiation treatment were less anxious after receiving one of two complementary treatments—relaxation response therapy or Reiki therapy. Those who received the relaxation response therapy also showed improvement in their sense of emotional well-being.

Asthma

Stress clearly plays a role in many cases of asthma. Normally, as you breathe in, air passes through the bronchioles (small airways inside the lungs) to air sacs called alveoli, where oxygen from the incoming air is passed into the bloodstream. Meanwhile, blood returning to the lungs gives up carbon dioxide, which collects in the alveoli and is drawn back through the bronchioles to be expelled as you breathe out. The autonomic nervous system, which constricts and dilates the bronchioles, is highly sensitive to stress. Strong arousal—whether from a perceived threat, upsetting news, or an emotional confrontation—can provoke the bronchioles to constrict, which makes it more difficult to move air in and out. As a result, stress and intense emotions, such as fear or anger, can trigger asthma attacks (bouts of breathlessness and wheezing) in some people who have asthma (see Figure 4, above right). Of course, physical stressors, such as cold weather and exercise, can do the same.

The extent of stress's role in the development of asthma is still being debated. Intense family stress

Figure 4: 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.

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.

Can stress management help?

Possibly. In 2016, an article published in the *Cochrane Database of Systematic Reviews* summarized findings from 15 randomized trials of yoga in people with asthma. The authors found some evidence that yoga may offer small improvements in quality of life and symptoms. But yoga's effects on lung function and medication use remain uncertain. ♥

The different faces of stress

Perceptions of what constitutes a stressful situation and reactions to stress vary from person to person. Yet common factors play into the stress levels in our lives. How old are you? Are you caring for an elderly or sick relative? Are you working (or do you wish you were)? Stress may affect you differently at different stages of life.

Adolescence and stress

As any parent can tell you, teens—and even “tweens”—are feeling the effects of stress in record numbers. What many parents might not realize is how strongly their own stress affects their children: children who say their parents always seem stressed are eight times as likely to report stress themselves as children who say their parents never seem stressed, according to a 2013 survey from the American Psychological Association. An upsurge in certain parental behaviors—like yelling, arguing, and complaining—tip off children that parents feel worried or stressed.

So, other than parents, what stresses teens in particular? High on the list are academic pressures, especially among students who hope to go to college; social pressures (think of friends, romance, and bullies); and worry about the future. Teens who report feeling under stress often experience physical symptoms, such as headaches, stomach upset, and trouble sleeping. Depression, anxiety, upticks in violent behavior (like lashing out at others physically), and even suicide are possible consequences, too.

Just like adults, teens may manage their stress in a variety of ways—and their coping skills aren’t necessarily positive. The top three coping strategies reported by the APA are listening to music (66%), watching TV (34%), and playing video games (30%). Although this sounds fairly benign, these are sedentary activities with poor implications for overall health. Substance abuse, binge eating or not eating, and cutting themselves with razors or other sharp objects are more worrisome choices for stress relief.

Tips for taming teen stress

IF YOU’RE A TEEN:

- Regular exercise is a great stress reducer (see “Exercise regularly,” page 33)—and it can help slim your figure or build your muscles at the same time.
- Imagine success. If you have an exam coming up, put yourself in the picture as you meditate by imagining yourself acing the test (see “Guided imagery,” page 27, for tips).
- Going to bed and getting up at regular hours may be a challenge, but better sleep also helps keep you on an even keel.
- As soon as you start to feel stressed, try taking a few deep belly breaths (see “Breath focus,” page 25).
- You can easily learn relaxation response techniques (see “The relaxation response,” page 23). Mini-relaxations take as little as 15 to 60 seconds (see “Try a mini-relaxation,” page 46).

IF YOU’RE A PARENT:

- Remember that your behavior when under stress affects your teen. Managing your own stress may actually decrease the amount of stress your teen feels—and you’re providing an excellent role model to follow.
- Work with your child to learn the tools needed to stop, breathe, reflect, and choose (see page 40) when negative thoughts send stress skyrocketing (“I’m terrible at math—I’m bound to flunk this test”; “My best friend isn’t answering my texts—she must be furious with me”). Practicing together could be helpful to you both.
- At dinner, go around the table asking everyone to share one good thing that happened during their day. Simple pleasures, kind acts, and personal victories all qualify: “I have three new followers on Instagram,” “I forgot to bring lunch and my friend shared his with me,” or “I got an A on my bio project.” This reinforces positive feelings.

One study at the Benson-Henry Institute tested the feasibility of a four-week, eight-session curriculum for high school students combining relaxation exercises, tenets of positive psychology, and skills to help recognize and reframe negative thoughts. Reporting in the *Journal of Adolescence* in 2011, the researchers noted that the curriculum prompted positive changes in perceived stress, anxiety, and health-promoting behaviors, particularly among teenage girls.

Work and stress

Americans spend long hours working. In recent decades, cellphones, telecommuting, and email 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 the cost of living also feed anxiety.

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? The answers are important. According to the Women's Health Study, which included more than 17,000 female health professionals, women whose work is highly stressful have a 40% greater risk of heart dis-



Some people perceive tight deadlines and challenges at work as exciting and stimulating. For others, the daily grind at work saps their energy and stresses them out, putting their health at risk.

► Tips for taming work-related stress

- For fast relief, try a mini-relaxation (see page 46).
- Halt cognitive distortions before they get too strong a toehold. One way is to stop, breathe, reflect, and choose (see page 40).
- Take a 10-minute break for a body scan (see page 26) on days when tension builds up.
- Practice self-nurturing techniques at work as well as outside of it. Buy flowers for your desk, have lunch with your favorite co-workers, or go for a short walk.
- Practice mindfulness (see “Use mindfulness to reduce workday stress,” page 47).
- Change your perspective on unforeseen events. Unexpectedly caught in traffic? Instead of fuming, finish listening to that podcast you were saving.

ease compared with their less-stressed colleagues. Earlier studies found similar trends among men: one documented a doubled risk of newly diagnosed heart disease among men who felt the rewards they received at work weren't compatible with their effort.

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,” above.

Of course, lack of a job can be just as stressful or even more so than working. Too often, the jobs held by people define their places in society. As a result, 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. 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 and exaggerations can help you manage realistic and unrealistic fears (see “Try cognitive restructuring,” page 39). Practicing relaxation and self-nurturing techniques will lower your stress levels. Websites 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 43).

Aging and stress

Does your age have any effect on stress? The so-called paradox of aging finds that people with more limited time horizons live more in the present and are happier as a result. They don't get as upset about things as they used to when they were younger, and they simply take things in stride better. However, major reversals in health and financial security can threaten these gains.

Certainly some shattering life events, such as the death of a spouse or partner, 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 sources of stress.

A dwindling interest in exercise—tied, perhaps, to osteoporosis or compromised sight, hearing, and balance as you grow older—can also set off a cycle of declining physical abilities and increasing frailty. Is that stressful? Just ask anyone who worries 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.

Fortunately, not all of these consequences are inevitable, and when they do occur they can some-

times be reversed. 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," below.

Caregiving and stress

Caring for others fulfills a basic social contract in ways that can draw generations and individuals closer. Certainly, caring for an elderly parent or ailing spouse or partner is a worthy, often satisfying pursuit. But it isn't easy. If you're among the estimated 66 million Americans acting as caregivers for friends, family, or neighbors, you may often wrestle with stress as well as exhaustion, anger, guilt, grief, and other emotions.

Two-thirds of these 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 earlier

Tips for taming stress for older adults

- Attend a mind-body program. These can help at any age. Some are specifically designed for seniors. Others may focus on chronic pain or specific ailments, such as heart disease.
- Engage in regular physical activity. If you are infirm, ask your doctor whether you might benefit from certain types of exercise, such as tai chi, which enhances balance. Many other kinds of physical activity improve your health, lift your mood, and reduce stress, too.
- If insomnia is a considerable source of stress, a special type of cognitive behavioral therapy designed to treat insomnia, called CBT-i, may help. It aims to correct ingrained patterns of self-defeating behavior and negative thoughts that can rob you of sufficient amounts of sleep. In fact, the American College of Physicians now recommends CBT over medications as the first-line treatment for insomnia.
- Consider whether you might benefit from a course in assertiveness training that would help you state your wishes and handle conflicts.
- Join a support group if you are dealing with bereavement.
- Think about getting a pet—both the pluses and minuses. Several studies support the stress-lowering effects of having a dog, cat, or other animal companion. But don't forget to take into consideration the physical and financial challenges of pet ownership.
- 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.

Tips for taming caregiver stress

- Relaxation response techniques and nurturing techniques (see “Nurture yourself,” page 42) 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. The Eldercare Locator at www.eldercare.gov can help you find varied services for older adults and their families; it’s run by the Administration on Aging. The Rosalynn Carter Institute for Caregiving, at www.rosalynncarter.org, also provides recommendations for evidence-based caregiver support programs.
- 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. Take advantage of regular respite care from professionals, family, and friends to give you 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; for a quick link to it, go to www.health.harvard.edu/cgteam). Others are run by local hospitals, senior centers, and community groups.
- 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. Linking those who can lend a hand has gotten much easier with new websites and apps that help friends, family, and communities coordinate care. Two examples of helpful sites are CaringBridge (www.caringbridge.org) and Lotsa Helping Hands (www.lotsahelpinghands.com).
- When someone offers help, accept. Keep handy a list of small tasks people can do, such as calling regularly, cooking an occasional dinner, shopping, and running errands. You can dole out tasks or ask people to check off what they can do.
- Accept that circumstances change quickly. Periodically reassess what you can offer and what assistance you need. If it’s getting too hard 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 (www.aginglifecare.org) or 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.
- Accentuate your spiritual connectedness to something greater than yourself, be it to God, community, or the natural world.
- Remember that you’re doing this not solely out of obligation. Focusing on the love you hold for your loved one can help dial back stress when things become frustrating and overwhelming.

death among caregivers. Additionally, research reveals that ongoing stress endured by older adults caring for spouses with Alzheimer’s disease has a negative impact on the caregiver’s own mental functioning.

In order to give care to others, you need stress relief, support, and time for yourself and your family. The “Tips for taming caregiver stress” above may help.

What about 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. But do you even realize the effects these are having? The checklist on page 21 will help you recognize your personal stress warning signs.

Once you’re aware of how stress makes you feel and act, you can use the many different tools described in the second half of this report to help quell its effects.

Before turning to this, though, consider whether you typically choose healthy or unhealthy responses to stress and find out more about how the connection of mind and body may harm—and help—you.

Healthy vs. unhealthy responses to stress

You probably have your own ways of dealing with stressful times. Some may be healthy, such as calling a friend, treating yourself to a massage, or curling up in bed earlier than usual. Others may not be as helpful. All too often, people self-medicate or turn to other unhealthy behaviors in an attempt to relieve pressure. They may do so in a variety of ways. These are some examples of less healthy responses to stress:

- 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

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 check off all the symptoms you recognize.

Physical symptoms

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

Behavioral symptoms

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

Emotional symptoms

- | | | |
|---------------------------------------|---|---|
| <input type="checkbox"/> Crying | <input type="checkbox"/> Nervousness | <input type="checkbox"/> Loneliness |
| <input type="checkbox"/> Irritability | <input type="checkbox"/> Feeling anxious | <input type="checkbox"/> Unhappiness with no clear cause |
| <input type="checkbox"/> Edginess | <input type="checkbox"/> Quick temper | <input type="checkbox"/> Depression |
| <input type="checkbox"/> Anger | <input type="checkbox"/> Lack of meaning in life and pursuits | <input type="checkbox"/> Feeling powerless to change things |
| <input type="checkbox"/> Boredom | | |

Cognitive symptoms

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

Other symptoms

- 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 illegal or unsafe drugs
- taking prescription or over-the-counter drugs that

promise some form of relief, such as sleeping pills, muscle relaxants, or anti-anxiety pills.

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. Studies suggest that nurturing social ties can not only relieve stress, but also provide health benefits—with no calories!

Gender and stress

The physiology of the stress response is similar for everyone. But some researchers believe you'll experience and respond to stress in distinctly different ways depending on whether you're a woman or man.

Community surveys taken in many countries find that 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. According to a national survey by the American Psychological Association, more women than men say they are under a great deal of stress. Also troubling, 49% of women surveyed reported that their stress has increased in the past five years, compared with 39% of men.

Why the disparities? 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. Men, on the other hand, more often report financial stress than women do, which makes sense since men are traditionally expected to be the breadwinners.

Some interesting research suggests that women and men also tend to cope with stressful situations in different ways. A team of UCLA psychologists published a study in *Psychological Review* finding 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. It evolved to strengthen the nurturing bond between a mother and her child. But oxytocin also dampens anxiety, induces relaxation, and may heighten trust—possibly encouraging an impulse to reach out to others when distressed. It is intriguing to speculate whether “tend-and-befriend” could have positive consequences for women. After all, social connections are key to reducing the damaging effects of stress and enhancing resilience. Interestingly, the effects of oxytocin are enhanced by female sex hormones and diminished by male sex hormones. But males given intranasal oxytocin in experiments display greater trust responses in an economic game. Experts also say that there may be a downside to oxytocin. While it builds trust and caring within a group, it may heighten suspicion and spark tension in relationships with people outside the group. More research is needed to assess the contribution of these different effects on stress load.

Regardless of your gender, it pays to practice stress reduction techniques and to steer your responses to stress in more healthy directions. ♥

The relaxation response

In the late 1970s, cardiologist Herbert Benson launched landmark research into the health hazards of stress and the body's counterbalancing potential for self-healing. Dr. Benson, director emeritus of the Benson-Henry Institute for Mind Body Medicine and the original medical editor of this report, coined the term "the relaxation response." Learning how to evoke this health-enhancing response is a core feature of managing stress and one of the tools you can use to foster resilience. (Other important resilience-building strategies are described in the next chapter.)

© Mediormages/Photodisc | Thinkstock

Eliciting the relaxation response

Two simple steps. That's all it takes to elicit the relaxation response, a deep physiologic shift in the body that is the opposite of the stress response. Try these two steps anytime you feel stressed in order to regain a sense of calm and peace.

Step 1: Choose a calming focus. Good examples are your breath, a sound ("Om"), a short prayer, or a positive word (such as "relax" or "peace") or phrase ("breathing in calm, breathing out tension"; "I am relaxed"). Repeat this aloud or silently as you inhale or exhale.

Step 2: Let go and relax. Don't worry about how you're doing. When you notice your mind has wandered, simply take a deep breath or say to yourself "thinking, thinking" and gently return your attention to your focus.

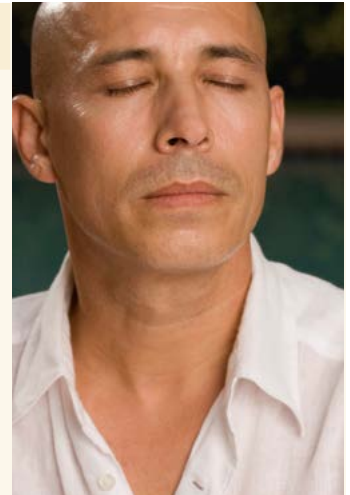
The relaxation response puts the brakes on the runaway biological changes that put us into overdrive. By carving out 10 to 20 minutes daily to practice techniques that elicit the relaxation response, you can help reduce the cumulative effects of stress on your body.

A number of physiological changes occur during the relaxation response. Heartbeat and breathing slow down. The body uses less oxygen, and blood

Relaxing the brain

A small study of five people 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 overall 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.

Neuroimaging researcher Sara Lazar at Massachusetts General Hospital has also shown in MRI studies that parts of the brain's frontal cortex that are important in managing stress are thicker in experienced meditators who regularly elicit the relaxation response through mindfulness meditation. Lazar and her colleagues now suspect that this structural change may help meditators slow normal aging, though more research is needed.



flows more easily throughout the circulatory network of veins and arteries. Blood lactate levels, which some researchers believe are linked with anxiety attacks, decline markedly.

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

- breath focus (see page 25)
- body scan (see page 26)
- guided imagery (see page 27)
- mindfulness meditation (see page 27)
- yoga, tai chi, or qigong (see page 29)
- repetitive prayer (see page 30).

Of course, these are not the only techniques that can help you elicit the relaxation response. What's crucial is that the method you choose interrupts the

train of everyday thoughts by letting you focus on a word, phrase, prayer, or repetitive activity. Once you learn these techniques, you can practice them regularly almost anywhere. No special equipment or expert trainer is required, although many people find mind-body programs, relaxation response CDs, and meditation or yoga classes helpful as they learn a new technique (see “Resources,” page 52).

Rather than choosing just one technique to elicit the relaxation response, we recommend sampling many. Some methods are bound to work better for you than others (see Table 1, below). If your favorite fails to engage you at times, you’ll have an alternative. And many people get the best results from combining several techniques.

Embracing a routine

Whether you are trying to lose weight, exercise more, or teach your body to relax, establishing a new behav-

ior can be challenging at first. Creating a routine for relaxation response sessions will help you make your new behavior stick. Therefore, it’s best to practice regularly, once or twice a day. Choosing a particular time of day can enhance the sense of ritual, which will enable you to practice more easily. Many people choose to use relaxation techniques in the morning before breakfast, since it can be hard to schedule time later in the day. You brush your teeth every morning, so use that habit as a reminder to “brush your brain” as well. Evidence suggests the more regularly you use these techniques, the better the outcome.

Aim for at least 10 to 20 minutes daily. You might do this in one sitting, or try several five-minute segments spaced throughout the day. If you’re pressed for time, remember that any time spent eliciting the relaxation response is better for your mind and body than none. One option is to practice mini-relaxation techniques (see “Try a mini-relaxation,” page 46).

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
Breath focus	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 or heart or pulmonary failure
Body scan	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 or other difficulties with body image
Guided imagery	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	If you have intrusive thoughts that make imagery difficult; if you have difficulty with visualizations
Mindfulness meditation	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
Yoga, tai chi, and qigong	Three ancient arts of mindful exercise that combine rhythmic breathing with a series of postures or flowing movements	At times when your mind is racing; whenever you find it especially hard to settle down and focus; if you wish to enhance flexibility and balance	If you are not normally active or have health problems or a painful or disabling condition that might make these activities difficult; check with your doctor before starting
Repetitive prayer	Using a short prayer or phrase from a prayer to help enhance breath focus	If religion or spirituality is meaningful to you	If you are not religious

Breath focus

Breath focus is a simple technique to elicit the relaxation response. The first step is learning to breathe deeply from the diaphragm. Note that this technique may be uncomfortable for people with respiratory ailments, heart failure, or anxiety.

The importance of deep breathing

Watch a baby breathe and you'll notice that the infant's belly expands and contracts naturally with each deep breath. By contrast, most adults take only shallow breaths. Even when told to breathe deeply, they generally fill only their upper lungs, so that their chests rise. They should take a lesson from their children. When you truly breathe deeply—a practice called diaphragmatic breathing, abdominal breathing, or belly breathing—the air coming in through your nose fills your lungs from top to bottom rather than only the upper portion. Compared with the shallow, quick breaths you take when panic strikes, deep breathing feels very calming.

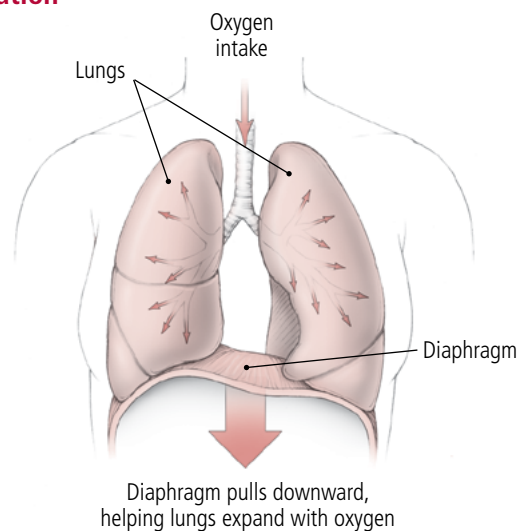
Try it for a few moments right now. First, place one hand on your chest with fingers comfortably apart. Now place your other hand just below your belly button. As you breathe deeply in and out, you should notice that your lower belly rises and falls. When you breathe more shallowly—which feels normal to many people—only your chest rises. Reawakening your inborn ability to breathe abdominally allows you to tap one of your body's strongest self-healing mechanisms.

Each time you breathe you engage the diaphragm, a strong sheet of muscle that separates your chest from your abdomen (see Figure 5, at right). 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. However, shallow breathing hobbles the diaphragm's range of motion. The lowest portion of the lungs—where many small blood vessels instrumental in carrying oxygen to cells reside—never gets a full share of oxygenated air, making you feel anxious and short of breath.

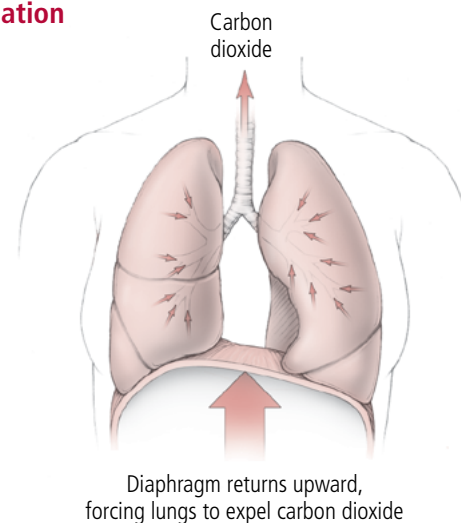
By contrast, deep abdominal breathing encourages full oxygen exchange—that is, the beneficial trade of incoming oxygen for outgoing carbon dioxide. Not surprisingly, this type of breathing slows the heartbeat and can lower or stabilize blood pressure.

Figure 5: What happens as you breathe

Inhalation



Exhalation



Learning to breathe abdominally is the first step in practicing breath focus, a stress management technique that elicits the relaxation response. As you breathe in, your diaphragm drops, giving your lungs the room they need to expand. As you exhale, your diaphragm pushes up against your lungs, which helps to expel the carbon dioxide.

If you are breathing properly, you should feel your lungs fill completely and both your chest and your belly expand.

Practicing breath focus

Breath focus is quite simple to do. Follow these steps:

1. Find a comfortable, quiet place to sit or lie down, and begin to observe your breath. First take a normal breath. Then try taking a slow, deep breath. Picture the air coming in through your nose moving downward, deep into your lungs. Let your abdomen expand fully. Now breathe out through your mouth (or your nose, if that feels more natural).

2. 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.

3. Now practice deep, 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.

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 use 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.
- Try saying these phrases silently to yourself:
“Breathing in peace and calm” on the inhale and
“Breathing out tension and anxiety” on the exhale.

Initially, 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 blends breath focus and visualization with progressive muscle relaxation. It helps you become more attuned to your body and aware of the connection between your mind and body.

Almost all of us carry unnecessary tension in our 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.

Practicing the body scan

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 the book *Mind Your Heart* by Dr. Herbert Benson and Aggie Casey:

- Choose a comfortable spot to sit or lie down, closing your eyes. Begin with two minutes of breath focus. Take slow, deep breaths, allowing your stomach to rise as you inhale and fall as you exhale.
- Next, 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 right 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.
- 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 on 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

Conjuring soothing scenes through guided imagery, or visualization, can be a powerful way of evoking the relaxation response. The images you choose—whether scenes, places, or experiences—enhance your sensation of inner calm and help break the chain of everyday

► Blue dots

A visual reminder can help you short-circuit stress. Blue dots—which you can buy in packets at any stationery or office supply store—do the trick quite nicely. Where should you put them? Any place where your stress meter tends to swing upward: on a car dashboard in readiness for traffic jams, near your work phone or computer, and maybe on the refrigerator or a cabinet where sweets are stashed.

Let the blue dot remind you to stop and breathe, while putting a halt to negative thoughts or distortions (see “Recognizing your distortions,” page 40); carve out time for the relaxation response; reach out to a friend; try a mini-relaxation (see page 46); or simply take a few deep, calming breaths till the traffic light turns green.

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 shown to lessen pain and the side effects of various drugs, including chemotherapy.

Lush descriptions of sandy beaches, bubbling streams, and fields of flowers that help people visualize calming scenes are available for free or a fee as downloads, CDs, or YouTube videos. Or you can record your own. Just be sure that the imagery you choose is soothing to you and has personal significance, because the exercise won't be effective otherwise. For example, a field of flowers could have negative associations if you suffer from hay fever.

Practicing guided imagery

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.
- If you aren't using recorded imagery, conjure up your own safe or special haven (perhaps a lake cabin, a beach house, your grandmother's kitchen, or a garden) and imagine yourself there.
- Allow all of your senses to be present. What do you smell—pine needles, rain steaming off hot pavement, vanilla in the kitchen? What do you hear and see? 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.
- Accept intrusive thoughts passively by observing them but not reacting to them. Then return to your focus. Practice for 10 to 20 minutes. (Also see “Harness the power of your mind,” page 48, for some longer guided imagery scripts you can try.)

Mindfulness meditation

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 cellphones while commuting to work. We pay the bills, munch on a snack, and listen to a spouse or partner 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. Rather than juggling tasks, you attend to just one at a time. Mindfulness 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. Scientists have discovered the benefits of using mindfulness meditation techniques to relieve stress and to help manage heart disease and other conditions such as high blood pressure, chronic pain, sleep problems, and gastrointestinal difficulties.

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. It enhances 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 and then let go of distracting thoughts and sensations that occur. Some experts in the field—such as Jon Kabat-Zinn, author of *Full Catastrophe Living* and founder 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. If time is limited, try a 20-minute session daily instead.

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:

- Start with breath focus and return to it periodically, staying aware of each inhalation and exhalation.
- Proceed with the task or pleasure at hand slowly and with full deliberation, such as enjoying the sweet taste of a single raisin.
- 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 mem-

brane into its juicy center, what sensations do you feel? Savor the taste.

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?

Yoga, tai chi, and qigong

Some types of exercise are especially effective at promoting relaxation. Yoga, tai chi, and qigong all increase flexibility and coordination, release muscle tension, and enhance tranquility. 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).

A study conducted at Ohio State University's Institute for Behavioral Medicine Research highlights the benefits of regular, sustained yoga practice. Although yoga delivered a mood boost both to yoga novices and experts, it seemed to help the experts—women who had practiced yoga once or twice weekly for at least two years—recover from stressful events more rapidly than novices did.

Researchers assessed certain physiological responses before and after the women participated in three activities: practicing yoga, walking slowly on a treadmill, and watching a video. The study also

measured these responses before and after certain stress-inducing events. The researchers found that blood levels of the stress-related compound interleukin-6 (IL-6), which is suspected of playing a part in conditions such as type 2 diabetes and cardiovascular disease, were 41% higher in the yoga novices as compared with the yoga experts. The novices also experienced higher heart rates than the experts when they were exposed to various stress-inducing events.

Other studies have found additional benefits. One showed that regular yoga practice for at least four years contributed to an average weight loss of five pounds in overweight, middle-aged adults tracked for 10 years. Because yoga wasn't vigorous enough to account for that much additional calorie

expenditure in these individuals, the researchers theorized that it might have affected weight by lowering concentrations of cortisol. Or, possibly, the mindfulness cultivated by practicing yoga helped create a heightened awareness of the body—a state of mind that translated into healthier eating and exercise habits.

Tai chi. A series of slow, fluid, circular motions that originated as a martial art, tai chi especially benefits older people. By enhancing balance and muscle strength, it helps prevent falls that can lead to fractures—nearly halving the risk for falls in one study of older adults—and girds against gradual decline in physical function. Its low-intensity movements produce declines

in blood pressure similar to those achieved with moderate-intensity aerobics, according to a 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. Lower levels of reported



Tai chi uses slow, fluid motions to provide a low-impact form of exercise and stress reduction. It helps lower blood pressure and enhances balance and muscle strength.

The power of prayer and an active spiritual life

People with an active religious life tend to stay healthier, live longer, and be happier, according to a number of studies. 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 on its own is not easy to document. One study in *Annals of Behavioral Medicine* sifted through

research claiming religion and spirituality have positive effects on cardiovascular disease and high blood pressure. The investigators disputed the results, citing numerous flawed or irrelevant supporting studies. And a well-controlled 2006 study did not show any benefit from so-called intercessory prayer (in which someone prays for a patient without the patient's knowledge) in people recovering from heart surgery.

Still, prayer clearly 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 down-to-earth assistance. 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 healthy habits, such as avoiding alcohol and tobacco.

stress, less pain, greater confidence in moving, and better balance were shown by people with rheumatoid arthritis ages 33 to 70 who practiced tai chi twice a week for 12 weeks.

Qigong. This ancient Chinese art melds breathing, meditation, gentle exercise, and flowing movements. Qi, or chi, is the Chinese word for the life energy believed to course through the body. Qigong 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. Qigong may also enhance balance and flexibility.

Repetitive prayer

Around the world, faith traditions are as deeply rooted as they are varied. If these roots help you feel grounded, a short repetitive prayer could be a good way for you to elicit the relaxation response. When prayer life is meaningful, repetitive prayer can enhance the relaxation response and possibly your health as well (see “The power of prayer and an active spiritual life,” above).

To reap the best benefits from a repetitive prayer as a religious person, it helps to believe that God is in your corner in this effort and has given your body an inborn ability to heal itself. Believing in the healing power of mind-body approaches—and specifically in the power of the prayer you've chosen to aid you—will help, too.

Keeping those points in mind, choose a favorite short prayer from your faith, or a phrase from it, to use as your focus when you elicit the relaxation response. Examples of prayers that can be deeply meaningful are

- The Lord is my shepherd
- Hail Mary, full of grace
- Sh'ma Yisrael
- Insh'Allah
- May all beings be filled with joy and peace
- Om.

Even if you do not belong to a particular religious faith—as is true of 16% of Americans, according to a recent Pew Forum survey—a meaningful secular prayer may have a place in your relaxation response repertoire. For example, you might consider choosing a phrase, such as “Grant me serenity,” from a secular version of the Serenity Prayer. ♥

Boosting your resilience

Why is it that two people in the exact same situation—perhaps hearing that their flight is canceled—can react in dramatically different ways? While one person yells, curses, and stomps his feet, his friend stops, takes a breath, and calmly gathers information about the other possible transportation options. Although neither has the power to make the flight depart as scheduled, both can control how they perceive the situation and how well they cope.

Your wellness depends on both the total amount of stress in your life (over which you may have little or no control) and your ability to deal with it—that is, your resilience. Fortunately, you have tremendous power to boost your resilience and expand your coping repertoire. Learning to elicit the relaxation response helps enormously in controlling stress. But it works best when combined with resilience training.

This chapter outlines the steps you can take to build your resilience, including self-care strategies like eating well, exercising, and nurturing yourself. It also describes ways to change how you approach stress-provoking situations through cognitive restructuring, reframing negative thoughts, and communicating more effectively. Also included are life-enhancing lessons from positive psychology and strategies to bolster your social support network. These tools can help you reduce stress and recharge your personal energy battery, topping it up rather than draining it day by day, as the frequent arousal of the stress response does (see “Is your energy battery charged?” at right).

Most likely, you’ll find that a combination of approaches will work best. Try sampling all the options to decide which will prove most helpful for you.

What is resilience?

Simply put, resilience is the ability to bounce back from difficult or stressful experiences. How you respond to stress is determined by many dynamic,

Is your energy battery charged?

Energy is a renewable resource. Imagine that you have a personal energy battery that recharges or drains as your life unfolds. Too much stress can deplete it, if you’re not taking steps to manage that stress. Do you take enough time to recharge your battery—or are you frequently running on empty? Look at our examples and then try this exercise on your own. The first time you try it, don’t be surprised if the list on the left outweighs the one on the right.

– WITHDRAWALS (drains on your energy)

- Not enough sleep last night; feeling so-so, but had to get to work
- Argument with my teenager before I left home
- Hectic workday
- Ate lunch in 10 minutes at my desk
- Plumbing problem at home
- Squabbled with my spouse over calling a plumber
- Didn’t make it outside for a walk—it was raining anyway!
- Got caught in bad traffic
- Rushed home after doing errands to make dinner

+ DEPOSITS (charges your battery)

- Went to bed early several nights this week so I’m feeling rested
- Had a chance to do breathing exercises
- My boss complimented me on a job well done
- Spent 15 minutes of my lunch hour walking
- Caught up with a friend by phone and made a date for a movie this weekend
- Did a mini-relaxation in the time it took my old computer to start up
- Started a new novel I’ve been wanting to read
- Tried stress reduction while stuck in traffic
- Ate a tasty dinner with fresh vegetables and herbs

Feeling charged? Congratulations! Keep recharging your energy battery regularly to counter stress.

Feeling drained? Try to work toward fewer withdrawals and more deposits. You’ll be surprised at how much a few small changes can do for you. Flip to “Your portable guide to stress relief” (page 44) to choose simple stress-easing strategies.

Are you facing major stressors? Combining several stress-reducing tools and techniques—regularly eliciting the relaxation response (see page 23), applying better communication and cognitive restructuring skills (see “Try cognitive restructuring,” page 39), and finding ways to nurture body and mind (see “Nurture yourself,” page 42)—will be most helpful.

interacting factors, including your genes and the family in which you were raised. These factors are embedded within your larger social realm, which is shaped by culture, economics, and politics, among other things.

Growing up in an environment surrounded by people who are loving, emotionally responsive, consistent, and reliable can help build resilience. In these situations, children are more likely to learn resilience skills (like regulating their emotions, calming themselves down, and sustaining close relationships with other people) compared with children who grow up in chaotic, unpredictable environments.

But even people who find challenging situations overwhelming and are prone to overreact to stress (by virtue of their genes, a difficult childhood, or a combination of factors) can still learn to be resilient adults, as the following sections show.

Change your mindset

Most of the time, people speak of stress as a bad thing. But as the first chapter of this report explained, it can sometimes be good. Some people thrive on stress, finding it energizing and exciting. Is it possible to modify your response to stress, so that you draw strength from it rather than having it sap your energy? Some research suggests that the answer is yes.

In one study at Columbia University, people going for a mock job interview were shown one of two videos about stress. The first started with a dire warning: “Most people know that stress is negative ... but research shows that stress is even more debilitating than you expect.” The second one offered a surprising message: “Most people think that stress is negative ... but actually research shows that stress is enhancing.” The video went on to explain that stress can give you the concentration to improve your performance, salient experiences that help you learn, and stimulation.

Both groups experienced the mock interview as stressful—a reaction that was virtually guaranteed by the sharp criticisms the interviewers doled out, regardless of what the participants actually said or did. As a result, both produced similar amounts of the stress hormone cortisol, as measured in their

saliva immediately afterward. But the second group had higher levels of another hormone called DHEA, which enhances recovery from the effects of cortisol. The distinguishing factor between the first response and the second was simply which three-minute video a participant had seen and, hence, what mindset the participant had when entering the interview.

Harnessing the upsides of stress

Changing your mindset doesn’t mean taking a Pollyanna view of the world. The key isn’t to deny stress, but to recognize and acknowledge it—and then to find the upside, because a full-throttle fight-or-flight response is not the only possible reaction to stress (at least when the stress does not involve a potentially life-threatening situation).

In people with a more stress-hardy mindset, the stress response is often tempered by the challenge response, which accounts for the so-called excite-and-delight experience that some people have in stressful situations, such as skydiving. Like the typical stress response, the challenge response also affects the cardiovascular system, but instead of constricting blood vessels and ramping up inflammation in anticipation of wounds, it allows for maximum blood flow, much like exercise. The balance of hormones is different, too, including more DHEA.

Another modification to the stress response is called tend-and-befriend, mentioned earlier (see “Gender and stress,” page 22). It explains why, after the September 11 terrorist attacks in 2001, the 2013 Boston Marathon bombing, or the 2016 massacre at the Pulse nightclub in Orlando, people felt the need to reach out to friends and relatives in the community—to assure themselves that loved ones were all right, to comfort the distressed or bereaved, and to shore up social networks. Connecting in this way actually helps reduce stress as opposed to, say, watching an endless loop of TV coverage. That’s because tend-and-befriend also involves different balances of hormones—in particular, increased levels of oxytocin, which enhances bonding between a mother and child or between sexual partners, for example. It makes the brain’s reward centers more responsive to social contact, and it is an important part of resilience.

Dialing back from full-on fight-or-flight can be simply a matter of changing your mindset. Studies have shown that when participants are told “You’re the kind of person whose performance improves under pressure,” it does—by as much as one-third. How can you shift your mindset? A 2015 book called *The Upside of Stress* by Kelly McGonigal (see “Resources,” page 52) gives multiple ideas. Here are just a few suggestions:

- When you notice a racing heart—for example, before you give a presentation or initiate a tough conversation—realize that your body is trying to give you more energy and see if you can capitalize on that.
- If you are feeling nervous, pause to consider why, and ask yourself if it’s because you’re doing something that matters to you and therefore reinforces your values and gives meaning to your life.
- Don’t deny the stress, but redirect your energy away from it and toward the task at hand.
- If you are feeling overwhelmed with work or cares, try doing some small act of kindness for someone and note the mental reward you reap.
- Nurture your social networks. Caring creates resilience (see “Seek social support,” page 36).
- Try to focus on the larger purpose of whatever you’re doing. When you’re stuck in a traffic jam taking your daughter to school, remember that it’s

because you love her and want her to get a good education.

- Whatever you’re doing, don’t pretend that stress doesn’t exist. People who deny it tend to isolate themselves and reinforce their fears. Instead, ask yourself why you’re experiencing this stress and look for any positive aspects to it. Are you learning something from it? Are you gaining strength? Are you connecting with people on a more fundamental level? Do you feel more intensely alive? (See “Try cognitive restructuring,” page 39.)

Exercise regularly

If exercise were available as a pill, experts say, everyone would be taking it. That’s because accumulating 30 minutes a day of moderate-intensity activity—a brisk walk, for example, or even housework—delivers a wealth of health-enhancing benefits. Exercise improves cholesterol levels, lowers blood pressure, helps keep bones strong and healthy, and enhances the immune system, while dampening low-level, chronic inflammation. It can boost metabolism and mood.

What’s more, exercise defuses stress. 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. No bus handy? Just about any form of motion helps

relieve pent-up muscle tension. Exercise also increases the production of feel-good chemicals known as endorphins—the same ones that are responsible for the runner’s high. In addition, certain activities, such as yoga, tai chi, and qigong, and rhythmic, repetitive exercise, such as walking, running, swimming, bicycling, and rowing, elicit the relaxation response, too. Regularly engaging in these kinds of activities can help you counteract everyday stress.

Better health through resilience training?

People who graduated from a resilience-boosting program developed by the Benson-Henry Institute used health care services considerably less in the year following the course compared with the year before, according to a 2015 study in the journal *PLoS One*.

The eight-week course, called the Stress Management and Resilience Training (SMART)—Relaxation Response Resiliency Program (3RP), incorporates the many strategies described in this report. The study compared health care use by more than 4,400 of the program’s graduates to that of 13,150 people who didn’t take the course. All the participants were members of Partners HealthCare, a system that includes several Harvard-based hospitals and other Boston-area health care facilities.

In the year after training, use of health care services by the program’s graduates dropped by 43%. These observational findings don’t prove the training was responsible for the decline in health care use. However, the correlation was present even after researchers accounted for many other factors that could affect the amount of health care people seek—especially age, gender, race, education, and income level.

As Harvard psychiatrist John Ratey points out in his 2008 book *Spark*, exercise helps prevent the damaging effects of stress and can reverse damage that has already occurred. Exercise protects brain cells in the hippocampus (a part of the brain involved in learning and memory) against the harmful effects of chronic stress-related increases in cortisol and can improve regulation of emotions as well.

To boost the stress-relief rewards even more, try shifting 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 works as well on nature walks as it does during strength training. As you lift and plant each foot, or as you raise and lower the weights, coordinate your breathing with your movements, focusing your attention mindfully on the sensations in your body.

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 transforming routine exercise into something more. 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.

Safety first

Though exercise is one of the healthiest things you can do, injuries can happen, so care is in order:

- If you aren’t normally active, or if you have health problems or a painful condition, speak with your doctor before starting an exercise program.
- When you exercise, listen to your body. Perform only movements that feel comfortable to you. As you grow stronger or more limber, you can gradually expand your range.
- If you wish to try yoga, tai chi, or qigong, join a class with an experienced instructor who can help you learn the movements correctly and adapt the program to your needs, if necessary.
- 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.

Eat well

As many people can attest, stress can have a significant effect on appetite and eating habits. In an emergency, stress shuts down the desire to eat. The hypothalamus produces corticotropin-releasing hormone, which suppresses appetite, and the brain tells the adrenal glands to pump out epinephrine. These hormonal cues signal the body to divert energy to other, more pressing matters than eating.

But if stress persists, it’s a different story. The adrenal glands also release cortisol, which increases appetite and may also ramp up motivation, including the urge to eat. If the stress doesn’t go away—or if a person’s stress response gets stuck in the “on” position—cortisol may stay elevated.

Numerous studies—granted, many of them in animals—have shown that physical or emotional distress increases the intake of food high in fat, sugar, or both. Fat- and sugar-filled foods seem to have a feedback effect that inhibits activity in the parts of the brain that produce and process stress and related emotions. These foods really are “comfort” foods in that they seem to counteract stress—and this may contribute to people’s stress-induced craving for those foods. However, these foods are not linked to a healthful diet and

may foster weight gain. Ultimately, they only increase stress—and you don't have to wait until you develop heart disease to start feeling the effects.

High-sugar foods provide a short-lived boost, but at a high cost to your mood. A study of 3,486 middle-age participants, published in *The British Journal of Psychiatry*, found that those who ate a diet consisting of whole foods—vegetables, fruits, nuts, whole grains, and fish—suffered far less depression than those who loaded their diets with processed foods (including sweetened desserts, fried food, processed meat, and refined grains) and high-fat dairy products.

A whole-foods diet simply makes you feel better, giving you greater resilience. It makes you less subject to mood swings. Scientists are still unraveling all the reasons why that's true, but some answers seem clear. In part, it's because a whole-foods diet contains many components, including antioxidants, B vitamins, and omega-3 fatty acids, that have been associated with better mood and mental functioning. In part, it's because complex carbohydrates are metabolized more slowly and therefore help maintain a more even blood sugar level, which creates a calmer feeling.

For guidance on a healthful diet, look at the Healthy Eating Plate from Harvard Medical School and the Harvard T.H. Chan School of Public Health (see Figure 6, at right). Does it resemble what you normally eat? If so, wonderful—you're fueling your body with plenty of healthy foods. If not, consider a few simple changes to strengthen your current diet:

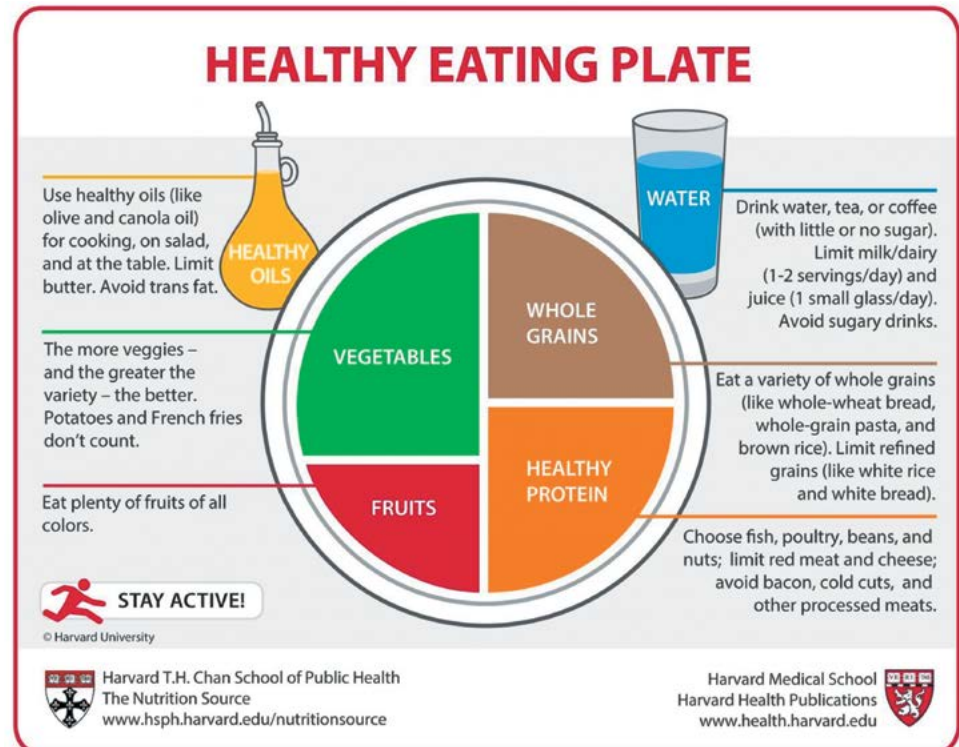
- Add a half-cup serving of vegetables or fruit to your daily fare, perhaps in a morning smoothie or an afternoon snack.

- Expand the color palette of your meals by choosing a range of deep-hued vegetables and fruits, which tend to have more antioxidants and important nutrients.
- Every week, try one new vegetable or fruit you've never eaten before.
- Replace some sources of unhealthy fats (such as meat, cheese, and most commercial baked goods) with healthier sources (such as olive or canola oil, nuts, and cold-water fish like salmon).
- Replace foods made with refined grains like white rice or white flour for those made with whole grains like brown rice, barley, whole wheat, and quinoa.

Mindful eating

Food offers comfort and pleasure as well as nourishment, but often we're so distracted by working, reading, or watching TV as we eat that we barely notice our food, much less take the time to savor each bite.

Figure 6: Harvard's Healthy Eating Plate



If you follow this general guideline for healthy eating from the Harvard T.H. Chan School of Public Health and Harvard Health Publications, you will consume foods that not only are healthy, but also act as natural stress reducers.

You can derive much more pleasure from meals by taking the time to eat mindfully.

To practice mindful eating, start by eliminating distractions like the background drone of the TV or even a propped-up book. Clear the table of clutter and set a place for yourself before sitting down to eat. Close your eyes for several seconds, and inhale and exhale deeply to help yourself focus. Bring your full attention to the moment. Now, look at your food. 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, but concentrate instead on the mouthful you're actually eating at that moment. Bringing all your senses into play can sharpen your taste for fresher, healthier foods and help break the cycle of stress-related eating.

Pay attention to how you feel not only while you're eating, but before and after you eat. 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.

Seek social support

Just as a boat is protected by the rubber bumpers that separate it from a hard dock, so, too, do people benefit when social buffers soften the inevitable bumps and bruises of life. Strong evidence suggests that social isolation is a very powerful force in predisposing mammals to stress-related illnesses. For all of us, based on our evolution as social organisms, stress emerges when our social attachments are insecure. Strengthening our social support can do much to lessen our innate fear of separation, thereby reducing stress. A host of epidemiological studies in human populations show that social ties—at least those that represent positive relationships—significantly protect health and well-being and lengthen life.

In Sweden, researchers following more than 17,000 men and women for six years found that those who 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 some 7,000 Alameda County residents for



© Jupiterimages | Thinkstock

Social bonds are as crucial to mental well-being as the rubber bumpers on a boat that keep it from being damaged when it knocks against a hard dock. Social support is an important part of resilience.

nine years found that a lack of strong community and social bonds multiplied the likelihood of dying during the study period by roughly two to three times, independent of factors such as smoking and obesity.

Our 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—immune cells that can destroy 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. One study of women with breast cancer who were living with a spouse or partner examined the effects of relationship stress on recovery. Researchers found that even five years after the original diagnosis, those in stressful relationships recovered more slowly—showing greater signs of psychological distress, poorer physical health, and a steeper reduction in physical activity—than their counterparts who were in stable relationships.

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 help spruce up affordable housing to mentoring a child or businessperson. To find opportunities that fit your talents and interests, check with the organizations VolunteerMatch (www.volunteermatch.org) or Senior Corps (www.seniorcorps.org), or call your local chapter of the United Way.
- Find like-minded people through intriguing classes and organizations, or by harnessing reputable social media engines that can link you to just about anyone interested in doing just about anything.
- Remember that social support is a two-way street. Offer assistance to friends, family, and neighbors. Accept help or a hand reached out in friendship 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. Plus, taking a dog for walks encourages you to be active and links you with like-minded animal lovers. Dogs have been successful in reducing the suffering and anxiety of patients with PTSD, even returning wounded warriors. This may partly be explained by the recent finding that when you look into the eyes of your pet dog, your oxytocin level rises—and so does the oxytocin level in the dog!
- 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.

Try positive psychology

What helps us thrive as we move through life? Answers are starting to emerge from the field of positive psychology—a burgeoning field recognized by

the American Psychological Association that studies factors that contribute to our well-being instead of searching for the roots of unhappiness. Researchers investigate the ingredients of a good life and weigh the effects of traits like optimism, humor, and even eccentricity on meeting the stressful challenges of life. Many experts who design stress management programs now draw on the lessons of positive psychology to help people learn to reframe their outlook and mimic the mindset of those who are naturally more stress-hardy.

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. Optimists may fare better physically, too. In a long-term study, adults classified as pessimists had a 19% higher risk of dying over the course of 30 years than did those identified as optimists. Other research suggests that a sense of optimism may offer some protection against heart disease.

If you're not a natural optimist, this information could merely fuel your pessimism. Don't let it. Take a deep breath and relax. Then try tapping into some of the lessons of positive psychology.

Nurture gratitude. Gratitude is thankful appreciation for the goodness in your life. It helps people feel more positive, relish positive experiences, enjoy better health, build stronger relationships, and deal better with adversity and stress. In one study, participants were asked to write a few sentences each week, focusing on five things. One group wrote about things they were grateful for that had occurred during the week. A second group wrote about daily hassles or things that had displeased them. The third group wrote about events that had affected them, with no emphasis on the events being positive or negative. After 10 weeks, those who wrote about gratitude were more optimistic and felt better about their lives. Surprisingly, they also exercised more and had fewer visits to physicians than those who focused on hassles. One way to boost gratitude is by keeping a gratitude journal (see page 49).

Laugh often. Researchers have found that laughter boosts immune system activity and lowers the amount of circulating stress hormones, such as epi-

Boost your happiness and well-being

Looking for ways to feel happier and fight off depression? One study found that these exercises can help, particularly when they are done regularly.

1 Find three good things every day. Each evening for the next week, reflect on your day and choose three things that went really well. Spend 10 minutes writing about them in a journal. It's important to write these down, rather than simply noting them in your head. These things 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, a wife might write that her husband picked up ice cream "because my husband is really thoughtful sometimes."

2 Use signature strengths in a new way. First, identify your top five strengths. You can do this by taking the VIA character survey, at www.viacharacter.org. Alternatively, simply 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 from the work of Martin E.P. Seligman, Ph.D., director of the University of Pennsylvania Positive Psychology Center and author of Authentic Happiness (Free Press, 2002) and Flourish (Atria, 2013).

nephrine and cortisol. Many mind-body practitioners even prescribe laughter, often urging their patients to rent funny movies, read amusing books, and embrace the absurd in daily life.

Savor pleasure. Savoring is placing your attention on pleasure as it occurs, consciously enjoying the experience as it unfolds. It's like mindful eating (see page 35), but carried over into other aspects of your life. Often people let everyday pleasures slip by without much notice, while placing a great deal of emphasis on stressors. Savoring can help reverse that trend, especially when you share pleasurable experiences with friends and family.

Use your inner strengths. Strengths are built-in capacities and capabilities. When you play from your strengths, you are likely to feel more energetic and to perform better. To help you assess your strengths, positive psychologists at the VIA Institute of Character have developed an online questionnaire called the Inventory of Signature Strengths Survey, available at www.viacharacter.org. The 30-minute, 240-question

survey provides a ranking of your top five strengths. But knowing your strengths is helpful only if you use them. Try to identify your key strengths and use one in a new way each week (see "Boost your happiness and well-being," above).

3 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. 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?

Of the three exercises, the gratitude visit initially provided the best results, but the benefits faded after three months. The first two exercises, however, continued to deliver—and over time, with greater practice, they gave even better, longer-lasting results.

Perform random acts of kindness. It's good to be good. Research demonstrates that people who help others often have happier, healthier lives. One study even found that people who derive happiness from doing things for others rather than for themselves showed beneficial gene expression changes similar to those seen with regular meditation.

Manage stress the "write" way, with a journal

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, or a blank document on your computer, can offer enormous release and, possibly, insight into hidden conflicts that are often a source of stress.

James W. Pennebaker, former chair of psychology at the University of Texas at Austin, worked on a series of classic studies requiring 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 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 a livelier immune system response for the next six weeks.

Why does writing about emotional issues improve not only emotional but also physical health? Pennebaker theorizes that confiding bottled-up feelings relieves stress that otherwise would ratchet up blood pressure, heart rate, and muscle tension.

Writing it out

Clinicians at the Benson-Henry Institute for Mind Body Medicine have used the following journal exercise to help 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 the course of several days often enables you to work through difficult emotions and reach resolution or acceptance.

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 circumstances, 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 write about a positive event to identify ways to bring more joy and meaning to your life. For this exercise, set aside 10 minutes to write 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 the details of the event as well as how you felt at the time. After you're done writing, take a few minutes to think about your feelings. Were you 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?

Try cognitive restructuring

Stop for a moment and try to remember the thoughts that were running through your head the last time you were late for work. Perhaps a simple thought, such as "the train is late," quickly transformed into "I'll be late to work. I won't make it to my meeting on time. My job is in jeopardy." Consider, too, 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," and "I'm not as good as everyone else." Often, our negative thoughts are riddled with irrational distortions. Try-

ing to bat away these feelings can be like swatting at gnats—that is, NATs, as some experts call these negative automatic thoughts—flying around your head.

Negative automatic thinking can engage the stress response almost as easily as a large, growling dog bounding in your direction. For people who get caught in a rut of negative thinking, there is a tendency to catastrophize—that is, to blow things out of proportion, which in turn leads to a physiological stress response. Some people have a greater tendency to do this than others. Worse, research shows that what starts out as a habit of thinking negatively can provoke a long-term stress response, making a person vulnerable to a variety of chronic illnesses, including depression.

But take heart. You needn't knuckle under to negative thoughts. A type of therapy called cognitive behavioral therapy is built on the premise that thoughts and perceptions shape moods and emotions—and that distorted thinking can be changed with practice. You can learn to deflate negative thoughts through cognitive restructuring, a technique that helps you change the way you think. That, in turn, can help you change how you feel.

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 partner 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 color-

ing in a glass of water. It's as though you are filtering out all the light and only see darkness.

Disqualifying the positive. You are unable or unwilling to accept a compliment or praise. You deflect all compliments with self-deprecation. You might say, “It's no big deal” or “It was nothing.”

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.” Often these emotions are residual feelings that linger from other experiences in your past.

“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 sound awfully familiar. The next step is

learning how to challenge these 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 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 recast your dream by realizing that you enjoy singing, regardless of whether that's in the Metropolitan Opera or a community chorus, you could set course for a new goal and actually meet it.

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

Stop. Consciously call a mental time-out when you feel stressed. By saying "Stop," you can halt the negative stress cycle in its tracks.

Breathe. Take a few deep breaths to reduce physical tension and step back from the stressor before you react.

Reflect. Ask yourself the following questions: Is this thought or belief true? Did I jump to a conclusion? What evidence do I actually have? Is there another way that I could view the situation? What's the worst that could happen? Does it help me to think this way?

Choose. Decide how to deal with the source of your stress. For example:

- Problem solve what you can control. Gather information, ask advice, make a plan, and take action.
- Accept what you cannot change—a death, perhaps—drawing meaning from it, if possible. Have empathy for yourself; seek social support, as appropriate; express feelings and seek counseling if needed; use your stress management tools.
- Challenge distorted, irrational thinking and adjust your view of reality using cognitive restructuring techniques. Remember, many things we worry about never come to fruition. Ask yourself the following questions: How else can I think about this? What else can I do to cope more effectively?

Here's an example of how this approach might work. If you get stuck in traffic on the way to work, stop and notice stress signs such as a tight neck and shoulders. Try to relax and take a few deep breaths. Reflect: "It's just a traffic jam. It's not worth getting this upset." Don't assume you'll be fired. Tell yourself, "I'll just be a few minutes late. I'm doing the best I can. I can handle this."

Learn to communicate better

Communicating effectively is a powerful tool. It helps ward off the stress you experience from behaving either too passively or too aggressively. This is especially true in the workplace, where miscommunication can result in much undue stress. Indeed, better communication skills are even being encouraged to promote performance and well-being in hospital operating rooms—among the most stressful places on earth. And some research suggests that a supervisor's listening attitude and communication skill can affect psychological stress reactions, particularly among male subordinates.

Learning to listen actively and communicate assertively can improve your ability to manage conflicts, prevent situations from escalating, and lessen the likelihood of stressful misunderstandings.

- To listen actively, appreciate other people's realities without making judgments or interrupting. This kind of empathetic listening takes practice, but it can make a difference in the tone discussions take.
- To speak assertively, use calm, unemotional language that acknowledges the other person's perspective and allows your own opinion to be heard. By doing so, you relay the message that "I count and you count."

Try this exercise to practice listening actively and speaking assertively. First, find a partner. Start by taking the role of the communicator while your partner is the listener. As the communicator, tell your partner about a stressful or frustrating experience. Use clear, calm, assertive language. Avoid accusations such as "You always make me feel..." and stick to first-person language such as "I feel ____ when you ____." Meanwhile, the listener should listen and resist the urge to

interrupt. Then, switch roles. At the end of the exercise, take turns paraphrasing what each of you heard your partner say and how you think they were feeling. Ask for validation. How did it feel to be listened to without interruption or judgment? Think about how you can use these techniques in real-life situations, especially those you find stressful or contentious.

Nurture yourself

Learning to nurture yourself is another key tool for managing stress. Few professions involve more caregiving stress than that of nursing. In a 2015 study of nurses' resilience, one way that palliative care nurses (who often care for terminally ill patients) reduced their stress and developed resilience was through self-nurturing, which included coping adaptively, accepting their limitations, and being compassionate toward themselves.

While you may know a great deal about nurturing others, satisfying your own needs may not be second nature. Think about how you treat yourself when you make a mistake, fail to reach a goal, or find yourself

drifting into a general pattern of inaction or lack of direction. Do you blame yourself or feel worthless? Or do you console yourself, take time to nurture yourself, and gradually build the motivation to try again? If you tend to beat yourself up when things go wrong, you, like most people, can use a little more self-compassion in your life.

Luckily, self-compassion is a learnable skill. Here are some ways to engender it:

Comfort your body. Eat something healthy. Lie down and rest. Take a walk. Get a massage. Anything you can do to improve how you feel physically gives you a dose of self-compassion (see “Massage: Putting stress relief in other hands,” below).

Give yourself encouragement. Think of what you would say to a good friend if the same thing had happened to him or her. Direct these compassionate responses toward yourself when you are frustrated or angry with yourself.

Try loving-kindness meditation. There is even a school of meditation that helps develop self-compassion. Loving-kindness meditation is a variation on traditional Buddhist meditation. It is oriented

Massage: Putting stress relief in other hands

Massage offers many of the same benefits seen from other methods that elicit the relaxation response. It lowers blood pressure and heart rate and may enhance certain measures of immune function. Massage has been found to boost the activity of pleasure-related brain chemicals in people with a broad range of physical and psychological conditions. A 2014 review suggests that massage using moderate pressure (as opposed to lighter strokes) reduced depressed and anxious moods as well as heart rate, and it altered brain-wave patterns, as happens in the relaxation response. Some research suggests it lowers levels of the stress hormone cortisol, though not all studies agree on this.

One study showed that women with breast cancer who participated in massage therapy three times a week for five weeks experienced 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 (online at www.amtamassage.org, or toll-free at 877-905-0577) and the National Certification Board for Therapeutic Massage and Bodywork (online at www.ncbtmb.org, or toll-free at 800-296-0664).



© Mike Watson Images | Thinkstock

toward enhancing unconditional, positive emotional states of kindness and compassion—not only toward others, but also toward oneself. In a 2015 study, loving-kindness meditation was associated with stress reduction, even in inexperienced meditators.

Creativity, productivity, and leisure

Try nurturing yourself in other ways, too. The nerve-jangling pressure of lengthy daily “to do” lists in all our lives can leech 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 meaningful ways, you add to your stock of energy and joy.

What does “creativity” mean to you? Writing a short story? Sculpting clay? Knitting a sweater? 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 hit karaoke night to try out some tunes. You needn’t audition for a musical theater production unless that’s your dream.

If you have no idea where to turn, take a look online or 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 whether 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.



Creative pursuits can have a major impact on stress reduction. Gardening provides a way to get in touch with nature and the joy of seeing flowers and other plants grow.

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 helps others often offers special satisfactions. Such volunteer opportunities abound for people of every age and level of ability. Check online or call 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 selfish when a lengthy “to do” list beckons. Productive and even creative pursuits are more likely to meet with accepting nods. Yet playfulness invites joy back into your life. And embracing such opportunities for 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 10 to 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. Or do something active and absorbing like going to a batting cage, a golf-course driving range, or a basketball court to practice your athletic moves in a mindful way. Whatever you choose, 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 ultimately pays dividends to others. ♥

Your portable guide to stress relief

Pressed for time? Join the club. Whether you have one minute or half an hour, dipping into the seven stress-busting suggestions here will 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 described here and see if these suggestions work for you.

Frequently late? Apply time management principles. Consider your priorities (be sure to include time for yourself), then delegate or discard unnecessary tasks. Map out your day, segment by segment, setting aside time for different tasks, such as answering emails, writing memos, or returning phone calls. If you get waylaid online, put away distractions—no texts, tweets,

emails, or games—while you dive into tasks. 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. Tracking time for various tasks can help you become more realistic.

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 page 40).

Unsure of your ability to do something? Don't try to go it



© Catherine Yeulet | Thinkstock

alone. If the problem is work, talk to a co-worker or supportive boss. Ask a knowledgeable friend, check reliable online sources, 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 CDs, books, or classes, for example, if you need a little tutoring. This works equally well when you're learning relaxation response techniques, too.

© Catherine Yeulet | Thinkstock

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

Not enough time for stress relief? Try mini-relaxations. Slow down to pay attention to every sensory aspect of a single task or pleasure. Or commit to one week of rising a bit early or paring down your schedule sufficiently to allow time to evoke the relaxation response every day.

Feeling unbearably tense? Try a massage, a hot bath, a body scan, mini-relaxations, or a mindful walk. Practically any form of exercise—a brisk walk, a quick run, a sprint up and down the stairs—will help, too. When done regularly, exercise wards off ten-

Exercise is one of the best stress relievers available. It lifts your mood, makes you feel good, and has long-term benefits for your health, too.



sion, just as relaxation response techniques do.

Frequently feel pessimistic? Optimism can be learned, at least to some extent. Practice deflating your cognitive distortions. Create a mental list of reasons you have to feel grateful. Count the things that have gone right today—from the cashier who smiled at you to the newspaper that was delivered on time. Invite a friend to dinner. Remind yourself of the value of learned optimism: a more joyful life and, quite possibly, better health.

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 a class on assertiveness training.

Worn out or burned out? Nurture yourself. 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 spirit by seeking out others. Don't forget to exercise. 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 a particular task at work to be taken off your hands? Do you want to do it at a later date? Do you need someone with particular expertise to assist you?

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 com-

munity 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 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, who 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 each 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 with-

out 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, and that the scenarios you imagined never came to pass.

3 Try a mini-relaxation

Mini-relaxations can help calm 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.

Minis are intended to take only a few seconds to a few minutes, though you can do them for any amount of time you want. Here are a few quick mini-relaxation techniques to try. We recommend doing three to four mini-relaxation exercises daily.

Mini breath focus

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 take a few slow, deep breaths.

Or alternatively, while sitting comfortably, take a few slow deep breaths and silently 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.

Mini counting

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.

Mini body scan

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 for a short while.

Mini massage

A combination of strokes you can do yourself 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

Mini-relaxations can be surprisingly effective, whether you're stuck in traffic or facing an important meeting at work. One technique is a mini massage, which can include massaging your temples.



© Tom Le Goff | Thinkstock

prising that 70% of Americans cite work as a significant source of stress in their lives, according to the most recent national survey from the American Psychological Association.

Try these tips to take the edge off the stress you feel during your workday.

- While on the way to work, take a bit of time to do a body scan. If you're driving, loosen your death grip on the steering wheel, lower your tensed shoulders, and let your tight tummy relax.
- Take a five-minute break every few hours, but use this time to take a walk instead of simply pausing.
- Throughout your workday, monitor your tension levels and stress warning signs. Consciously try to relax and let go of your tension.
- Deliberately set aside a few minutes every hour or two to take some deep, diaphragmatic breaths.
- Have a mindful lunch in a new location, eating slowly and enjoying your time with yourself.
- At the end of your workday, think back on the day and acknowledge and congratulate yourself on your accomplishments.
- As you are driving home, be conscious of whether or not you are rushing. How does it feel? Try to slow down and relax.
- When you arrive home, change out of your work clothes, take some deep breaths to center

of the body that falls easily within your reach.

For a short session, 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.

Mini guided imagery

Start by sitting comfortably in a quiet room. Bring your awareness to your breath 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.

4 Use mindfulness to reduce workday stress

Given job instability and the 24/7 pace technology has enabled us to achieve on the job, it is not sur-

yourself and, when possible, allow yourself five minutes of quiet before delving into activities there.

5 Harness the power of your mind

If you are feeling stressed or experiencing pain, these visualization exercises may help. They are especially effective once you have elicited the relaxation response because your brain is calmer and more focused, and you tend to be more open to suggestion and new information. Try making a recording of these visualizations—in either your own voice or that of a friend whose voice you find soothing.

Up, up, and away: Hot-air balloon visualization

Imagine that you are standing beside a grassy meadow. Now, allow all of your senses to be pres-

ent. Pay attention to every detail. Is it chilly outside? Can you see your breath? Or is it a warmer time of year? Is it sunny or cloudy? Continue to use all of your senses as you enter the meadow. What sounds do you hear? The wind? The rustle of leaves underfoot? Or the songs of birds or insects? Does the air smell of flowers? Or of dampness or leaves?

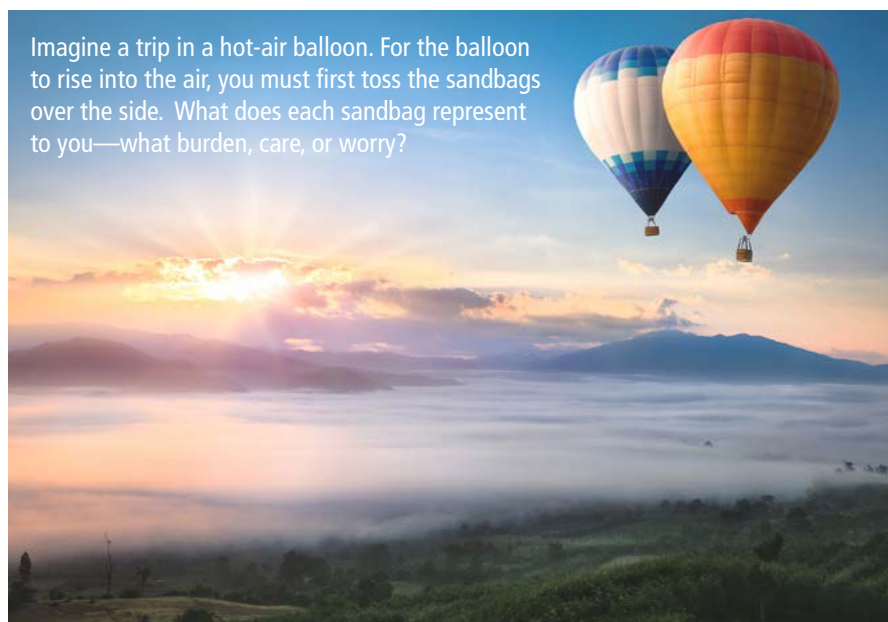
In the middle of the meadow is a colorful hot-air balloon. Come closer to it. Look carefully at the pattern of colors. You can choose to stay in the meadow and rest, or take a ride in the balloon.

If you choose to take a ride, slowly step into the basket. You see two small sandbags on the floor; on each sandbag are written words. Bend over and pick up one of the bags. This bag represents a burden, concern, or stress in your life. Notice what the words say, and then

gently toss this bag over the side of the balloon basket. As you let go of the sandbag, the balloon gets lighter and lifts off the ground. Pick up the other sandbag. Notice what this bag represents. Toss this bag over the side and then sit comfortably down in the basket. The balloon gets lighter and rises higher in the sky. You notice that with each burden you release, you also feel lighter and lighter just like the balloon. As you feel lighter, you begin to relax. Your muscles relax, and your mind becomes quiet. You might drift quietly among the clouds, floating lightly, feeling content, peaceful, and free of worries. Perhaps you choose to travel to a special or safe place. Sit quietly for several minutes, and continue to savor this time of silence with yourself.

It is time to begin your journey home. Remember that the balloon does not need the sandbags in order to land; there is no need to collect your burdens. Just leave them where they dropped. As the balloon slowly glides back toward the meadow, remember how it felt to release your burdens and concerns.

Focusing on how you felt during the balloon ride will help you repeat the experience when you feel stressed again in your daily life. Gently step out of the balloon and walk slowly back through the meadow, paying attention to your surroundings and being mindful of the experience of the moment. As you reach the edge of the meadow, transition back into the room,



Imagine a trip in a hot-air balloon. For the balloon to rise into the air, you must first toss the sandbags over the side. What does each sandbag represent to you—what burden, care, or worry?

and become aware of the sights, sounds, and smells around you.

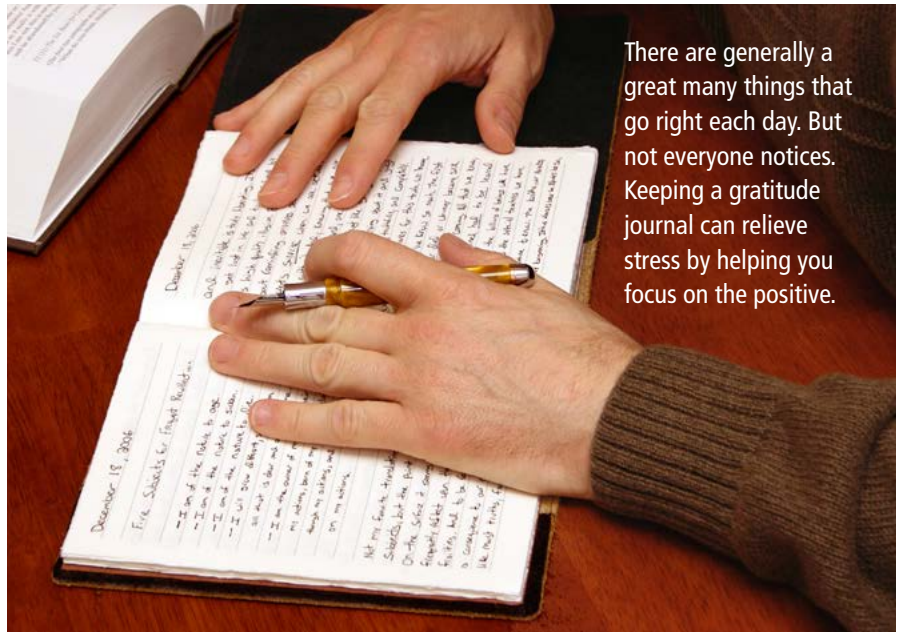
Evaporating pain: Visualization for headache sufferers

Headaches are a common result of stress. The good news is that stress reduction can often reduce headache pain. Here is one visualization strategy that can provide relief.

Close your eyes and try to imagine what your headache looks or feels like. Imagine that it is a hard steel band weighing down your forehead, eyelids, and nose. It is so hard that it is difficult for you to move the muscles in your face.

Now, you notice a dim, blue light appear. It settles above the hard steel band of headache and locks onto it. As the blue rays target your headache, the hard surface begins to soften. Gradually, it becomes softer and more pliable. You notice movement in the band like ripples on a lake. Take a few slow breaths, allowing the muscles of your face to relax.

The light continues to melt your pain. You feel your forehead loosen slightly as the hard band releases its grip. Now, the entire band is liquid, and it begins to evaporate. Your eyelids and forehead feel lighter as the liquid turns to steam, rising above your head. Your entire face relaxes as you see the last of the liquid disappear above you. You are engulfed in a soothing vapor. Your head and face feel light and relaxed, and you can breathe easily.



There are generally a great many things that go right each day. But not everyone notices. Keeping a gratitude journal can relieve stress by helping you focus on the positive.

Now, focus on your breath. Take a few more slow, diaphragmatic breaths, paying attention to how peaceful and relaxed you feel. When you are ready, slowly open your eyes, stretch, and resume your day.

6 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 what brightens your life and to help you turn your focus away from negative thoughts and feelings. It can also help you realize how many things in your life are actually going right.

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.

Be as specific as possible. Don't just say "I love my family," but focus instead on concrete sights, sounds, and experiences, such as a hug from your child, a compliment from your partner, a call from a friend, a sunset, or birds chirping outside your window. Celebrate accomplishments large and small—learning to master a new hobby, doing well on a project at work, or just 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.

7 Develop your personal plan for stress relief

Having a personalized stress-relief plan can help you manage stress

Table 2: My plan for stress management

WAYS TO HANDLE STRESS	THIS WEEK I WILL TRY	DAYS AND TIMES SET ASIDE	WHAT I NOTICED
<p>Evoked the relaxation response through techniques such as breathing and a body scan (see "Eliciting the relaxation response," page 23).</p>			
<p>Identify your stress warning signs (see "My stress warning signs," page 21) and your negative thinking patterns (see "Try cognitive restructuring," page 39).</p>			
<p>Practice communicating assertively and listening actively to reduce the chance of misunderstandings and frustration (see "Learn to communicate better," page 41).</p>			
<p>Nurture yourself by setting aside time for relaxation, eating well, exercising, connecting with others, and pursuing activities that add joy to your life (see "Nurture yourself," page 42).</p>			

when it strikes—or even keep it from building in the first place. Choose a variety of approaches, so that you can find the ones that work best for you. Remember, the more you practice, the easier the process gets.

Let the first column of Table 2, page 50, refresh your memory of the tools at your disposal to help disarm the stress response. Then decide what you're willing to

try and when you can do it. Even small changes—penciling in a few mini-relaxations to break up daily tasks, reconnecting with a friend over coffee, eating a healthy 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? Don't be discouraged. Consider what got in the way and whether you set out to do too much. Ask yourself what strategies could help you avoid these obstacles next week. Finally, embrace what felt good and repeat it. Practicing these techniques regularly should put you on the path toward a more peaceful, joyous, and healthy life. ♥

Resources

Organizations

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

151 Merrimac St., 4th Floor
Boston, MA 02114
617-643-6090

and a second location at

Lurie Center
1 Maguire Road
Lexington, MA 02421
781-860-1945
www.massgeneral.org/bhi

This institute offers programs for people with stress-related medical conditions, such as high blood pressure, chronic pain, cancer, or infertility. It also offers programs for exercise, nutrition counseling, yoga, wellness, and comprehensive stress management, 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*, this 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 Integrative Health (NCCIH)

9000 Rockville Pike
Bethesda, MD 20892
888-644-6226 (toll-free)
866-464-3615 (TTY)
www.nccih.nih.gov

Part of the National Institutes of Health, this government agency has a blog and a wealth of online publications on complementary and integrative medicine, as well as information specialists available by phone. It also conducts and supports valuable research on integrative medicine.

Books

Grab a Tiger by the Toe: Stress-Proof Your Child

Marilyn Wilcher with Rana Chudnofsky and Laura Malloy
(Inkslingers Press ebook, 2012)

Written for parents of preschool through high school children, this book delves into common stresses that arise within families and explains the ways in which stress affects children at different

ages. It contains a wealth of approaches for managing stress based on programs developed by the Benson-Henry Institute for Mind Body Medicine and tailored specifically for children.

Managing Stress: Overcoming Stress in the Modern World

Joseph Shrand, M.D., with Leigh Devine, M.S.
(St. Martin's Griffin, 2012)

This self-care guide from Harvard Medical School knits together personal stories with explanations of what stress is and how it harms the body, then turns to a variety of techniques—including the relaxation response—to help manage it. Helpful chapters on handling severe stress and reducing the stress of people around you are included.

Relaxation Revolution: Enhancing Your Personal Health Through the Science and Genetics of Mind Body Healing

Herbert Benson, M.D., and William Proctor
(Scribner, 2010)

This book presents the latest scientific findings on how the mind can influence the body, including gene function. The book explores how people can harness the power of the mind to prevent life-threatening medical conditions, self-heal diseases, and supplement drugs and surgery—an approach that effectively constitutes the “third pillar” of medicine.

Say Goodbye to Stress

Jeff Brown, M.D., with Liz Neporent
(CSS Health, 2012)

A “Chicken Soup for the Soul” title that combines personal, often inspirational stories of people struggling with stressful situations in their lives with practical, step-by-step stress management tips.

The Science of Stress: Living Under Pressure

Gregory Fricchione, M.D., Ana Ivkovic, M.D., and
Albert S. Yeung, M.D.
(University of Chicago Press, 2016)

This book, co-authored by the medical editor of this report, explores the neurobiology of stress and its personal and social causes. It also delves into the connection of chronic stress to ailments like heart disease, diabetes, and depression—and discusses the antidote to stress, which focuses on enhancing resilience.

The Upside of Stress: Why Stress Is Good for You, and How to Get Good at It

Kelly McGonigal, Ph.D.
(Avery, 2015)

Taking issue with the traditional belief that all stress is bad, McGonigal argues that stress is an inevitable part of a meaningful life and that you can use it to your advantage by changing your mindset and developing resilience. The book is based on a class called The New Science of Stress that she teaches at Stanford.

Glossary

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: A stress hormone released by the adrenal glands during the stress response.

epinephrine and norepinephrine: Also called adrenaline and noradrenaline, 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.

focus word: A word or phrase that enhances 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 brain region, located above the brainstem, that contains a network of nerves that helps control the sympathetic and parasympathetic nervous systems and, through the pituitary gland, the endocrine system. It sparks the stress response by releasing the first of several chemical messengers that put the body on alert.

maladaptive stress response: An unhealthy physiological response to stressors, in which the stress response often does not turn off even when the stressor disappears.

mindfulness: A set of techniques that encourages you to slow

your pace and live fully in the moment.

mindfulness meditation: A form of meditation, with its roots in ancient Buddhist practice, in which the person has a calm awareness of his or her body and feelings and is fully engaged in the present; 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; a tendency to be easily startled; and 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.



Harvard Health Publications

Trusted advice for a healthier life

HB Receive *HEALTHbeat*, Harvard Health Publications' free email newsletter

Go to: www.health.harvard.edu to subscribe to *HEALTHbeat*. This free weekly email newsletter brings you health tips, advice, and information on a wide range of topics.

You can also join in discussion with experts from Harvard Health Publications and folks like you on a variety of health topics, medical news, and views by reading the Harvard Health Blog (www.health.harvard.edu/blog).

Order this report and other publications from Harvard Medical School

online | www.health.harvard.edu
phone | 877-649-9457 (toll-free)

mail | Belvoir Media Group
Attn: Harvard Health Publications
P.O. Box 5656
Norwalk, CT 06856-5656

Licensing, bulk rates, or corporate sales

phone | 203-828-0349
email | HHP_licensing@hms.harvard.edu
online | www.harvardhealthcontent.com

Other publications from Harvard Medical School

Special Health Reports Harvard Medical School publishes in-depth reports on a wide range of health topics, including:

- | | | |
|----------------------------|----------------------|-----------------------|
| Addiction | Exercise Your Joints | Positive Psychology |
| Allergies | Eye Disease | Prostate Disease |
| Advance Care Planning | Foot Care | Reducing Sugar & Salt |
| Aging Successfully | Grief & Loss | Rheumatoid Arthritis |
| Alzheimer's Disease | Hands | Sensitive Gut |
| Anxiety & Stress Disorders | Headache | Sexuality |
| Back Pain | Hearing Loss | Six-Week Eating Plan |
| Balance | Heart Disease | Skin Care |
| Caregiving | Heart Disease & Diet | Sleep |
| Change Made Easy | High Blood Pressure | Strength Training |
| Cholesterol | Incontinence | Stress Management |
| COPD | Knees & Hips | Stretching |
| Core Workout | Living Longer | Stroke |
| Gentle Core Workout | Memory | Thyroid Disease |
| Depression | Men's Health | Vitamins & Minerals |
| Diabetes | Neck Pain | Walking for Health |
| Diabetes & Diet | Nutrition | Weight Loss |
| Energy/Fatigue | Osteoarthritis | Women's Health |
| Erectile Dysfunction | Osteoporosis | Workout Workbook |
| Exercise | Pain Relief | Yoga |

Periodicals Monthly newsletters and annual publications, including:

- | | | |
|-------------------------------------|-----------------------------------|--------------------------------|
| <i>Harvard Health Letter</i> | <i>Harvard Heart Letter</i> | <i>Prostate Disease Annual</i> |
| <i>Harvard Women's Health Watch</i> | <i>Harvard Men's Health Watch</i> | |