

# Psychology in the News

## Man Crashes Plane Into Austin, Texas, I.R.S. Office

**AUSTIN, TX, February 18, 2010.** A software engineer who was angry with the Internal Revenue Service launched a suicide attack on the agency Thursday by crashing his small plane into a seven-story office building housing nearly 200 IRS employees, setting off a raging fire that sent workers fleeing for their lives. In addition to the attacker, two employees died in the blaze and two others were seriously burned.

The pilot has been identified as Andrew Joseph (Joe) Stack III, 53, of Austin, who posted a furious, six-page antigovernment farewell note on the Web before getting into his plane for his suicidal flight. Stack cited run-ins with the IRS and ranted about taxes, government bailouts, and corporate America's "thugs and plunderers." "I have had all I can stand," he wrote. "Well, Mr. Big Brother I.R.S. man, let's try something different, take my pound of flesh and sleep well."

Officials almost immediately ruled out the possibility that Stack was connected to terrorist groups. Friends described him as an easygoing man, a talented amateur musician, a husband with marital troubles, and a citizen with a grudge against the tax authorities. Although he was only 53, they said, he felt pushed "over the brink" because financial setbacks had required him to postpone his retirement dreams.

Stack also set fire to his house, which was about six miles from the crash site, before embarking on the suicide flight. His wife and her young daughter had escaped the night before.

Stack married Sheryl Housh about three years ago. He never spoke of his troubles with the IRS to her family, who

thought he seemed fine when they gathered at Christmas. But recently his wife complained to her mother and stepfather, Jack Cook, of an increasingly frightening anger in her husband, which she said was causing terrible problems in the marriage. Worried about her husband's rage, Sheryl Stack took her 12-year-old daughter to a hotel to get away from her husband. They returned on Thursday morning to find their house ablaze and all of their belongings destroyed. Officials said the house fire was deliberately set, with Stack as the primary suspect.

"This is a shock to me that he would do something like this," Cook said. "But you get your anger up, you do it."



Fire inspectors assess the damage to the office building destroyed by a man who was angry at the IRS and upset about recent financial setbacks. Two workers died in the blaze.

The Nature of Emotion

Emotion and Culture

The Nature of Stress

Stress and Emotion

Coping with Stress

Psychology in the News,  
RevisitedTaking Psychology with You:  
The Dilemma of Anger: “Let  
It Out” or “Bottle It Up”?

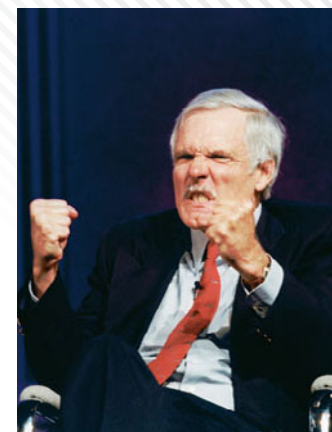
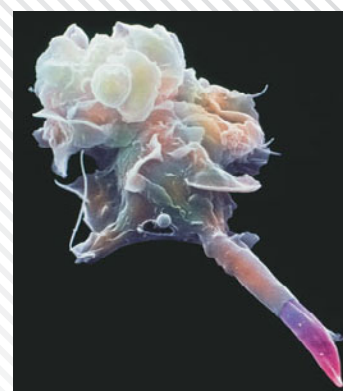
## Emotion, Stress, and Health

**A**lmost everyone can understand Joe Stack’s feelings of frustration, unhappiness, and anger, if not about their specific target. Fortunately, most people do not act on them the way Stack did. Why do some people give in to their emotions, whereas others are able to keep rage and other unpleasant feelings from turning into violent or self-destructive actions? Why are some people able to cope with the stresses of life—financial worries, broken expectations, marital conflicts, job loss—whereas others are completely overwhelmed and give up?

People often curse their emotions, wishing to be freed from anger, jealousy, shame, guilt, and grief. Yet imagine a life without emotions. You would be unmoved by the magic of music. You would never care about losing someone you love, not only because you would not know sadness but also because you would not know love. You would never laugh because nothing would strike you as funny. And you would be a social isolate because you would not be able to know what other people were feeling.

People often wish for a life without stress, too. Yet try to imagine a life without any stress whatsoever. You would live like a clam. You might have no difficulties, but nothing would surprise, delight, or challenge you either. You would never change, discover new frontiers, or be required to master skills you never imagined possible.

In this chapter, we will examine the physiology and psychology of emotions and stress. Prolonged negative emotions like anger can certainly be stressful, and stress can certainly produce negative emotions. Both of these processes, however, are shaped by how we interpret the events that happen to us, by the demands of the situation we are in, and by the rules of our culture.





## YOU are about to learn...

- which facial expressions of emotion most people recognize the world over.
- which parts of the brain are involved with different aspects of emotion.
- how mirror neurons generate empathy, mood contagion, and synchrony.
- which two hormones provide the energy and excitement of emotion.
- how thoughts create emotions—and why an infant can't feel shame or guilt.

## The Nature of Emotion

Emotions evolved to help people meet the challenges of life: They bind people together, motivate them to achieve their goals, and help them make decisions and plans (Nesse & Ellsworth, 2009). When you are faced with a decision between two appealing and justifiable career alternatives, your sense of which one “feels right” emotionally may help you make the better choice. Disgust, which no one enjoys feeling, evolved as a useful mechanism that protects infants and adults from eating tainted or poisonous food (Oaten, Stevenson, & Case, 2009).

Even embarrassment and blushing, so painful to an individual, serve important functions: appeasing others when you feel you have made a fool of yourself, broken a moral rule, or violated a social norm (Dijk, de Jong, & Peters, 2009; Keltner & Anderson, 2000). And the positive emotions of joy, love, laughter, and playfulness do not appear to be simply “selfish” feelings of pleasure; their adaptive function may be to help increase mental flexibility and resilience, build bonds with others, stimulate creativity, and reduce stress (Baas, De Dreu, & Nijstad, 2008; Kok, Catalino, & Frederickson, 2008).

In defining **emotion**, psychologists focus on three major components: *physiological* changes in the face, brain, and body; *cognitive* processes such as interpretations of events; and *cultural* influences that shape the experience and expression of emotion. If we compare human emotions to a tree, the biological capacity for emotion is the trunk and root system; thoughts and explanations create the many branches; and culture is the gardener that shapes the tree and prunes it, cutting off some limbs and cultivating others. Let's begin with the trunk.

### Emotion and the Body

Research on the physiological aspects of emotion suggests that people everywhere are born with

certain basic or **primary emotions**, which typically include fear, anger, sadness, joy, surprise, disgust, and contempt (Izard, 2007). These emotions have distinctive physiological patterns and corresponding facial expressions, and the situations that evoke them are the same all over the world: Everywhere, sadness follows perception of loss, fear follows perception of threat and bodily harm, anger follows perception of insult or injustice, and so forth (Scherer, 1997). In contrast, **secondary emotions** include all the variations and blends of emotion that vary from one culture to another or that depend on cognitive complexity.

Neuroscientists and other researchers are studying the biological aspects of emotions: facial expressions, brain regions and circuits, and the autonomic nervous system.

**The Face of Emotion** The most obvious place to look for emotion is on the face, where emotions are often visibly expressed. In 1872, Charles Darwin argued that human facial expressions—the smile, the frown, the grimace, the glare—are as innate as the wing flutter of a frightened bird, the purr of a contented cat, and the snarl of a threatened wolf. Such expressions evolved, he said, because they allowed our forebears to tell at a glance the difference between a friendly stranger and a hostile one.

Modern psychologists have supported Darwin's ideas about the evolutionary functions of emotion (Hess & Thibault, 2009). In particular, Paul Ekman and his colleagues have gathered abundant evidence for the universality of seven basic facial expressions of emotion, which correspond to the list of emotions usually identified as primary: anger, happiness, fear, surprise, disgust, sadness, and contempt (Ekman, 2003; Ekman et al., 1987). In every culture they have studied—in Brazil, Chile, Estonia, Germany, Greece, Hong Kong, Italy, Japan, New Guinea, Scotland, Sumatra, Turkey, and the United States—a large majority of people recognize the emotional expressions portrayed by those in other cultures (see Figure 13.1). Even most members of isolated tribes who have never watched a movie or read *People* magazine, such as the Foré of New Guinea or the Minangkabau of West Sumatra, can recognize the emotions expressed in pictures of people who are entirely foreign to them, and we can recognize theirs.

Lately, some researchers have argued that pride is also a basic human emotion; its adaptive function is to motivate people to achieve and excel, and thereby to increase their attractiveness to others and to their groups (Williams & DeSteno,

**emotion** A state of arousal involving facial and bodily changes, brain activation, cognitive appraisals, subjective feelings, and tendencies toward action.


**primary emotions** Emotions that are considered to be universal and biologically based.

**secondary emotions** Emotions that are specific to certain cultures.



FIGURE 13.1  
Some Universal Expressions

Can you tell what feelings are being conveyed here? Most people around the world can readily identify expressions of surprise, disgust, happiness, sadness, anger, fear, and contempt, no matter what the age, culture, sex, or historical era of the person conveying the emotion. Some researchers think that pride might also be a universal emotion. Can you find the face of pride in this group?


2009). Children as young as 4 years old, and people from an isolated culture in Africa, can reliably identify facial and bodily expressions of pride. Blind people who have just won an athletic competition will spontaneously throw their arms in the air in a V-for-victory symbol of triumph, though they have never seen anyone do it (Tracy & Robins, 2007, 2008).  **Watch**

Ekman and his associates developed a special coding system to analyze and identify each of the nearly 80 muscles of the face and the combinations of muscles associated with each emotion (Ekman, 2003). They learned that people generally use different groups of muscles when they are trying to convey a false emotion than when the expression is authentic. Thus, when people try to pretend that they feel sad, only 15 percent manage to get the eyebrows, eyelids, and forehead wrinkle exactly the

way that true grief is expressed spontaneously. Authentic smiles last only two seconds; false smiles may last ten seconds or more (Ekman, Friesen, & O'Sullivan, 1988).

### The Functions of Facial Expressions

Interestingly, facial expressions not only reflect our internal feelings; they also *influence* them. In the process of **facial feedback**, the facial muscles send messages to the brain about the basic emotion being expressed: A smile tells us that we're happy, a frown that we're angry or perplexed (Izard, 1990). When people are told to smile and look pleased or happy, their positive feelings increase; when they are told to look angry, displeased, or disgusted, positive feelings decrease (Kleinke, Peterson, & Rutledge, 1998). If you put on an "angry" face, your heart rate will rise faster than if you put on a

 **Watch the Video Show Your Pride** on [myspsychlab.com](http://myspsychlab.com)

**facial feedback** The process by which the facial muscles send messages to the brain about the basic emotion being expressed.



Great moms have always understood the importance of facial feedback.

➤ **Simulate**  
**Recognizing**  
**Facial**  
**Expressions of**  
**Emotions** on  
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“happy” face (Levenson, Ekman, & Friesen, 1990). The next time you are feeling sad or afraid, try purposely smiling, even if no one is around. Keep smiling. Does facial feedback work for you?

As Darwin suggested, facial expressions also probably evolved to help us communicate our emotional states to others and provoke a response from them—“Come help me!” “Get away!” (Fridlund, 1994). This signaling function begins in infancy. A baby’s expressions of misery, angry frustration, or disgust are apparent to most parents, who respond by soothing an uncomfortable baby, feeding a grumpy one, or removing unappealing food from a disgusted one (Izard, 1994b; Stenberg & Campos,

1990). And an infant’s smile of joy usually melts the heart of the weariest parent, provoking a happy cuddle. Babies seem primed to respond to adults’ expressions, too. Newborns will suck longer on a pacifier if it produces a happy face than if it produces a face with a neutral or negative expression (Walker-Andrews, 1997). (If you become a parent, remember this.)

Starting at the end of their first year, babies begin to alter their own behavior in reaction to their parents’ facial expressions of emotion, and this ability, too, has survival value. Do you recall the “visual cliff” studies described in Chapter 6? These studies were originally designed to test for depth perception, which emerges early in infancy. But in one experiment, 1-year-old babies were put on a more ambiguous visual cliff that did not drop off sharply and thus did not automatically evoke fear, as the original cliff did. In this case, the babies’ behavior depended on their mothers’ expressions: 74 percent crossed the cliff when their mothers put on a happy, reassuring expression, but not a single infant crossed when the mother showed an expression of fear (Sorice et al., 1985). If you have ever watched a toddler take a tumble and then look at his or her parent before deciding whether to cry or to forget it, you will understand the influence of parental facial expressions. And you can see why they have had such survival value for babies: An infant needs to be able to read the parent’s facial signals of alarm or safety because young children do not yet have the experience necessary for judging danger.

However, there are cultural and social limits to the universal readability of facial expressions. For

one thing, people are better at identifying emotions expressed by others in their own ethnic, national, or regional group than they are at recognizing the emotions of foreigners (Elfenbein & Ambady, 2003). Second, within a culture, facial expressions can have different meanings depending on the situation; a smile can mean “I’m happy!” or “I don’t want to make you angry while I tell you this.” Likewise, people will interpret identical facial expressions—even of “basic” emotions such as disgust, sadness, and anger—in very different ways, depending on what else they are observing in the social context (Barrett & Kensinger, 2010). Thus, almost everyone recognizes the facial expression of disgust, if that’s all they see. But when they see a picture of the same disgusted expression on a man with his arm raised as if to strike, they will say the expression is anger (Aviezer et al., 2008). ➤ **Simulate**

Finally, of course, facial expressions are only part of the emotional picture. People can feel sad, anxious, or angry without letting it show—and, conversely, they can use facial expressions to lie about their feelings. In Shakespeare’s play *Henry VI*, the villain who will become the evil King Richard III says:

*Why, I can smile, and murder while I smile;  
 And cry content to that which grieves my heart;  
 And wet my cheeks with artificial tears,  
 And frame my face to all occasions.*

**Emotion and the Brain** Various parts of the brain are involved in the different components of emotional experience: recognizing another person’s emotion, feeling a specific emotion, expressing an emotion, and acting on an emotion. For example, people who have a stroke that affects brain areas involved in disgust are often unable to feel disgusted. One young man with stroke damage in these regions had little or no emotional response to images and ideas that would be disgusting to most people, such as feces-shaped chocolate (Calder et al., 2000). Are you making a disgusted expression as you read that? He couldn’t.

Most emotions motivate a response of some sort: to embrace or approach the person who instills joy in you, attack a person who makes you angry, withdraw from a food that disgusts you, or flee from a person or situation that frightens you. The prefrontal regions of the brain are involved in these impulses to approach or withdraw. Regions of the *right* prefrontal region are specialized for the impulse to withdraw or escape (as in disgust and fear). Regions of the *left* prefrontal cortex are

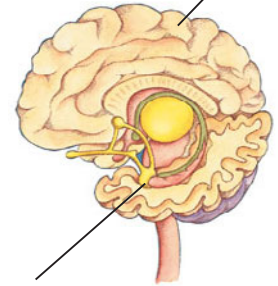
specialized for the motivation to approach others (as in happiness, a positive emotion, and anger, a negative one) (Carver & Harmon-Jones, 2009; Harmon-Jones, Peterson, & Harris, 2009). People who have greater-than-average activation of the left areas, compared with the right, have more positive feelings, a quicker ability to recover from negative emotions, and a greater ability to suppress negative emotions (Urry et al., 2004). People with damage to this area often lose the capacity for joy.

Parts of the prefrontal cortex are also involved in the *regulation* of emotion, helping us modify and control our feelings, keeping us on an even keel, and allowing us to respond appropriately to others (Jackson et al., 2003). When disease or head injury destroys cells in those areas of the frontal lobes, a person may become unable to respond to the emotions of others, understand why they and others feel as they do, and adjust their own emotional responses appropriately: A loving mother becomes indifferent to her child’s injury; a businessman does embarrassing things and doesn’t notice the reaction of others (Levenson & Miller, 2007).

The *amygdala*, a small structure in the brain’s limbic system, plays a key role in emotion, especially anger and fear. The amygdala is responsible for evaluating sensory information, determining its emotional importance, and making the initial decision to approach or withdraw from a person or situation (LeDoux, 1996). The amygdala instantly assesses danger or threat, which is a good thing, because otherwise you could be standing in the street asking, “Is it wise to cross now, while that very large truck is coming toward me?” The amygdala’s initial response may then be overridden by a more accurate appraisal from the cortex.

This is why you jump with fear when you suddenly feel a hand on your back in a dark alley, and why your fear evaporates when the cortex registers that the hand belongs to a friend whose lousy idea of humor is to scare you in a dark alley. If either the amygdala or critical areas of the cortex are damaged, abnormalities result in the ability to process fear. People with damage in the amygdala often have difficulty recognizing fear in others, and people with damage in the cortex may have difficulty “turning off” their own fear responses.

2. The cerebral cortex generates a more complete picture; it can override signals sent by the amygdala (“It’s only Mike in a down coat”).



1. The amygdala scrutinizes information for its emotional importance (“It’s a bear! Be afraid! Run!”).

### Mirror, Mirror, in the Brain: Neurons for Imitation and Empathy

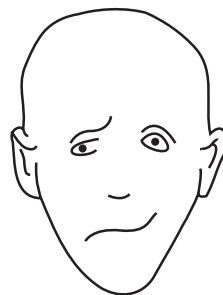
Some years ago, a team of Italian neuroscientists made an accidental, astonishing discovery. They had implanted wires in the brains of macaque monkeys, in regions involved in planning and carrying out movement. Every time a monkey moved and grasped an object, the cells fired and the monitor registered the brain activity. Then one day, a graduate student heard the monitor go off when the monkey was simply observing him eating an ice cream cone.

The neuroscientists looked more closely, and found that certain neurons in the monkeys’ brains were firing not only when the monkeys were picking up peanuts and eating them but also when the monkeys were merely observing their human caretakers doing exactly the same thing (Ferrari, Rozzi, & Fogassi, 2005). Moreover, these neurons responded only to very specific actions: A neuron that fired when a monkey grasped a peanut would also

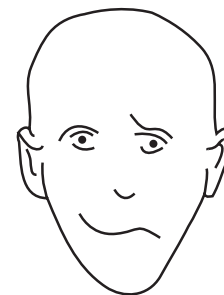
## Get Involved! Turn On Your Right Hemisphere

These faces have expressions of happiness on one side and sadness on the other. Look at the nose of each face; which face looks happier? Which face looks sadder?

You are likely to see face *b* as the happier one and face *a* as the sadder one. The likely reason is that in most people the left side of a picture is processed by the right side of the brain, where recognition of emotional expression primarily occurs (Oatley & Jenkins, 1996).



(a)



(b)



Mirror neurons are clearly at work in this conversation.

**mirror neurons** Brain cells that fire when a person or animal observes others carrying out an action; they are involved in empathy, imitation, and reading emotions.

fire when the scientist grasped a peanut but not when the scientist grasped something else. The scientists called these cells **mirror neurons**.

In human beings, mirror neurons enable us to identify with what others are feeling, understand other people's intentions, and imitate their actions and gestures (Iacoboni, 2008; Fogassi & Ferrari, 2007; Molnar-Szakacs et al., 2005). When you see another person in pain, one reason you feel a jolt of empathy is that mirror neurons involved in pain are firing. When you watch a spider crawl up someone's leg, one reason you have a creepy sensation is that your mirror neurons are firing—the same ones that would fire if the spider were crawling up your own leg. And when you see another

person's facial expression, your own facial muscles will often subtly mimic it, activating a similar emotional state (Dimberg, Thunberg, & Elmehed, 2000).

Mirror neurons thus appear to be the underlying mechanism for human empathy, nonverbal rapport, and *mood contagion*, the spreading of an emotion from one person to another. Have you ever been in a cheerful mood, had lunch with a depressed friend, and come away feeling vaguely depressed yourself? Have you ever stopped to have a chat with a friend who was nervous about an upcoming exam and ended up feeling edgy yourself? That's mood contagion at work.

When two people feel rapport with one another's *positive* emotions, nonverbal signals, and posture, however, the more synchronized their gestures become, the more cooperatively they will behave with each other, and the more cheerful they will feel (Wiltermuth & Heath, 2009). This phenomenon may be the reason that synchronized human activities—marches, bands, dancing—are socially and emotionally beneficial. And it means that our friends and neighbors may have more power over our moods than we realize. In a prospective study that followed nearly 5,000 people for 20 years, people who were in a “happy network”—whose partners, siblings, and neighbors living within a mile became happier over time—were more likely to become happier themselves (Fowler & Christakis, 2008). Conversely, those who had lonely friends were more likely to become more lonely themselves over time (Cacioppo, Fowler, & Christakis, 2009).



Talk about “mirror neurons”! These volunteers, videotaped in a study of conversational synchrony, are obviously in sync with each other, even though they have just met. The degree to which two people's gestures and expressions are synchronized affects the rapport they feel with one another. Such synchrony can also create a contagion of moods (Grahe & Bernieri, 1999).

**The Energy of Emotion** Once the brain areas associated with emotion are activated, the next stage of the emotional relay is the release of hormones to enable you to respond quickly. When you are under stress or feeling an intense emotion, the sympathetic division of the autonomic nervous system spurs the adrenal glands to send out *epinephrine* and *norepinephrine* (see Chapter 4). These chemical messengers produce arousal and alertness. The pupils dilate, widening to allow in more light; the heart beats faster; blood pressure increases; breathing speeds up; and blood sugar rises. These changes provide the body with the energy needed to take action, whether you are happy and want to get close to someone you love, or are scared and want to escape a person who is frightening you (Löw et al., 2008).

Epinephrine in particular provides the energy of an emotion, that familiar tingle of excitement. At high levels, it can create the sensation of being “seized” or “flooded” by an emotion that is out of your control. In a sense, you are out of control, because you cannot consciously alter your heart rate and blood pressure. However, you can learn to control your actions when you are under the sway of an emotion, even intense anger, as we discuss in “Taking Psychology with You.” As arousal subsides, anger may pale into annoyance, ecstasy into contentment, fear into suspicion, past emotional whirlwinds into calm breezes.

Although epinephrine and norepinephrine are released during many emotional states, emotions also differ from one another physiologically: Fear, disgust, anger, sadness, surprise, and happiness are associated with different patterns of brain activity and autonomic nervous system activity, as measured by heart rate, electrical conductivity of the skin, and finger temperature (Damasio et al., 2000; Levenson, 1992). These distinctive patterns may explain why people all over the world use similar terms to describe the primary emotions, saying they feel “hot and bothered” when they are angry or “cold and clammy” when they are afraid. These metaphors capture what is going on in their bodies.

In sum, the physiology of emotion involves characteristic facial expressions; activity in specific parts of the brain, notably the amygdala, specialized parts of the prefrontal cortex, and mirror neurons; and sympathetic nervous system activity that prepares the body for action.

**Biology and Deception: Can Lies Be Detected in the Brain and Body?** For centuries, people have tried to determine when a person is lying by detecting physiological responses that cannot be controlled consciously. This is the

idea behind the *polygraph machine* (lie detector), which is based on the assumption that a lie generates emotional arousal.

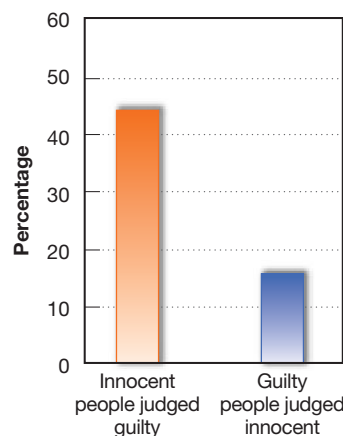
A person who is guilty and fearful of being found out will therefore have increased activity in the autonomic nervous system while responding to incriminating questions: a faster heart rate, increased respiration rate, and increased electrical conductance of the skin.

Thinking Critically about “Lie Detectors”



Law-enforcement officers are still enthusiastic about the polygraph, but most psychological scientists regard polygraph tests as invalid because no physiological patterns of autonomic arousal are specific to lying (Leo, 2008; Lykken, 1998). Machines cannot tell whether you are feeling guilty, angry, nervous, amused, or revved up from an exciting day. Innocent people may be tense and nervous about the whole procedure. They may react to the word *bank*, not because they robbed a bank but because they recently bounced a check; in either case, the machine will record a lie. The reverse mistake is also common: People who are motivated to escape detection can often beat the machine by tensing muscles or thinking about an exciting experience during neutral questions.

The polygraph will correctly catch many liars and guilty people. The main problem is that it also falsely identifies many innocent people as having lied (Saxe, 1994). (See Figure 13.2.) For this reason,



**FIGURE 13.2**  
**Misjudging the Innocent**

This graph shows the average percentages across three studies of incorrect classifications by lie detectors. Nearly half of the innocent people were classified as guilty, and a significant number of guilty people were classified as innocent. The suspect’s guilt or innocence had been independently confirmed by other means, such as confessions of other suspects (Iacono & Lykken, 1997).





"WE CAN'T DETERMINE IF YOU'RE TELLING THE TRUTH, BUT YOU SHOULD HAVE A DOCTOR CHECK YOUR PRESSURE."

about half of the states in the United States have ruled that polygraph results are inadmissible in court. But some government agencies and most police departments continue to use them, not for their accuracy but because they hope to scare people into telling the truth and induce suspects to confess—by telling them that they failed the test (Leo, 2008).

Because of the unreliability of the polygraph, researchers are trying to find other ways of measuring physiological signs of lying. The Computer Voice Stress Analyzer is based on the assumption that the human voice contains telltale signals that betray a speaker's emotional state and intent to deceive. Its promoters claim high degrees of accuracy, but research has yielded negative or inconclusive findings (Leo, 2008). Like the polygraph, the voice analyzer detects physiological changes that may

indicate fear, anger, or other signs of stress rather than lying.

The hottest new effort at lie detection is brain imaging. Some researchers are trying to find "brain fingerprints" by using fMRIs of brain activity to see whether they can infer whether a person possesses guilty knowledge of a crime and is lying about it. Two companies are already advertising that they can predict with better than 90 percent certainty if someone is telling the truth (Stix, 2008). Don't buy it. Areas of the brain that light up on an MRI when people are allegedly lying are also those involved with many other cognitive functions, including memory, self-awareness, and self-monitoring (Greely & Illes, 2007). And because of the normal variability among people in their autonomic and brain reactivity, innocent but highly reactive people are still likely to be mislabeled guilty by these tests (Stix, 2008).

To date, efforts to find physiological markers of lying have produced unreliable results because they rest on a faulty assumption: that there are inevitable, universally identifiable biological signs that reveal with high accuracy when a person is lying. We're telling the truth!

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## Quick Quiz

We hope that a little surge of hormonal energy will help you answer these questions.

1. Three-year-old Olivia sees her dad dressed as a gorilla and runs away in fear. What brain structure is probably involved in her emotional reaction?
2. Ana Maria is watching an old Laurel and Hardy film, which makes her chuckle and want to see more funny movies. Which side of her prefrontal cortex is likely to be most active?
3. Ana Maria is in a surly, grumpy mood but her friends make her come with them to a hilarious Laurel and Hardy film. She can't help laughing, and soon she finds that her grumpy mood is gone. What physiological mechanism might be the reason?
4. Casey is watching *Horrible Hatchet Homicides in the Haunted House*. What cells in his brain are making him wince when the hero is being attacked?
5. Casey is watching *Horrible Hatchet Homicides in the Haunted House II*. What hormones are causing his heart to pound and his palms to sweat when the murderer is stalking an unsuspecting victim?

Answers:


1. the amygdala and norepinephrine 2. the left 3. facial feedback: smiling and laughing communicate to her brain that she is happy 4. mirror neurons 5. epinephrine

## Emotion and the Mind

Two friends of ours returned from a mountain-climbing trip to Nepal. One said, "I was ecstatic! The crystal-clear skies, the millions of stars, the friendly people, the majestic mountains, the harmony of the universe!" The other said, "I was miserable! The bedbugs and fleas, the lack of toilets,

the yak-butter tea, the awful food, the unforgiving mountains!" Same trip, two different emotional reactions to it. Why?

In the first century A.D., the Stoic philosophers suggested an answer: People do not become angry or sad or ecstatic because of actual events, but because of their explanations of those events. Modern

psychologists have verified the Stoics' ideas experimentally. They have found that emotions are often created or influenced by beliefs, perceptions of the situation, expectations, and *attributions*—the explanations that people make of their own and other people's behavior (see Chapter 10) (Fairholme et al., 2009; Lindquist & Barrett, 2008). Human beings, after all, are the only species that can say, “The more I thought about it, the madder I got.” In fact, we often do think ourselves into an emotional state, and sometimes we can think ourselves out of it.  **Watch**

Psychologists have studied the role of cognitions in all kinds of emotions, from joy to sadness. Imagine that you get an A on your psychology midterm; how will you feel? Or perhaps you get a D on that midterm; how will you feel then? Most people assume that success brings happiness and failure brings unhappiness, but the emotions you feel will depend more on how you explain your grade than on what you actually get. Do you attribute your grade to your own efforts or to the teacher, fate, or luck? In a series of experiments, students who believed they did well because of their own efforts tended to feel proud, competent, and satisfied. Those who believed they did well because of a lucky fluke tended to feel gratitude, surprise, or guilt (“I don't deserve this”). Those who believed their failures were their own fault tended to feel regretful, guilty, or resigned. And those who blamed others tended to feel angry (Weiner, 1986).

Here is a more surprising example of how thoughts affect emotions. Of two Olympic finalists, one who wins a second-place silver medal and one who wins a third-place bronze medal, who will feel happier? Won't it be the silver medalist? Nope. In a study of athletes' reactions to placing second and third in the 1992 Olympics and the 1994 Empire State Games, the bronze medalists were happier than the silver medalists (Medvec, Madey, & Gilovich, 1995). Apparently, the athletes were comparing their performance to what might have been. The second-place winners, comparing themselves to the gold medalists, were unhappy that they didn't get the gold. But the third-place winners, comparing themselves to those who did worse than they, were happy that they earned a medal at all!


Cognitions and physiology are inextricably linked in the experience of emotion. Thoughts affect emotions, and emotional states influence thoughts (Fairholme et al., 2009). Blaming others for your woes can make you feel angry, but once you are angry you may be more inclined to think the worst of other people's motives. The



Most people assume that second-place winners feel happier about their performance than third-place winners do. Yet when psychologists questioned this assumption, they found that the opposite is true. Certainly, Olympic fencing bronze medalist Jean-Michel Henry of France (left) looks happier than silver medalist Pavel Kolobkov of the Unified Team (right). (Eric Strecki, center, won the gold for France.)

complicated mix of emotions that people feel when they have “disappointing wins” (outcomes that were not as good as they had expected) or “relieving losses” (bad outcomes that could have been worse) shows how powerfully thoughts affect emotional responses.

Some emotions require only minimal, simple cognitions or are primitive feelings that occur beneath awareness (Ruys & Stapel, 2008). A conditioned sentimental response to a patriotic symbol or a warm, fuzzy feeling toward a familiar souvenir involves simple, nonconscious reactions (Izard, 1994a; Murphy, Monahan, & Zajonc, 1995). An infant's primitive emotions do not have much mental sophistication: “Hey, I'm mad because no one is feeding me!” As a child's cerebral cortex matures, however, cognitions become more complex, as do emotions: “Hey, I'm mad because this situation is entirely unfair!” Some emotions depend completely on the maturation of higher cognitive capacities. Shame and guilt, for example, do not occur until a child is 2 or 3 years old. These *self*-conscious emotions require the emergence of a sense of self and the ability to perceive that you have behaved badly or let down another person (Baumeister, Stillwell, & Heatherton, 1994; Tangney et al., 1996).

 **Watch the Video**  
**Emotion Regulation:**  
James Coan on  
[myspychlab.com](http://myspychlab.com)

Children need to be old enough to have a sense of self before they can feel the moral emotions of shame, guilt, or remorse.



Today, almost all theories of emotion hold that attributions, beliefs, and the meanings people give to events are essential to the creation of most emotions. But where do these attributions, beliefs, and meanings come from? When people decide that it is shameful for a man to dance on a table with a lampshade on his head, or for a woman to walk down a street with her arms and legs uncovered, where do their ideas about shame originate? If you are a person who loudly curses others when you are angry, where did you learn that cursing is acceptable? To answer these questions, we turn to the third major aspect of emotional experience: the role of culture.

✓ **Study and Review** on [myspsychlab.com](http://myspsychlab.com)

## Quick Quiz

How are your thoughts affecting your feelings about this quiz?

1. Dara and Dinah get Bs on their psychology midterm, but Dara is ecstatic and proud, and Dinah is furious. What expectations and attributions are probably affecting their emotional reactions?
2. At a party, you see a stranger flirting with your date. You are flooded with jealousy. What cognitions might be causing this emotion? *Be specific.* What alternative thoughts might reduce your jealous feelings?

Answers:

1. Dara was probably expecting a lower grade and is attributing her B to her own efforts. Dinah was probably expecting a higher grade and is attributing her B to the instructor's unfairness, bad luck, or other external reasons. 2. Possible thoughts causing jealousy are "My date finds other people more attractive," "That person is trying to steal my date," or "My date's behavior is humiliating me." But you could be thinking, "It's a compliment to me that other people find my date attractive" or "It pleases me that my date is getting such deserved attention."



## YOU are about to learn...

- why people from different cultures disagree on what makes them angry, jealous, or disgusted.
- why psychologists debate whether there are primary and secondary emotions.
- how cultural rules affect the way people display or suppress their emotions.
- why people often do "emotion work" to convey emotions they do not feel.
- whether women are really more "emotional" than men.

## Emotion and Culture

A young wife leaves her house one morning to draw water from the local well as her husband watches from the porch. On her way back from the well, a male stranger stops her and asks for some water. She gives him a cupful and then invites him home

to dinner. He accepts. The husband, wife, and guest have a pleasant meal together. In a gesture of hospitality, the husband invites the guest to spend the night with his wife. The guest accepts. In the morning, the husband leaves early to bring home breakfast. When he returns, he finds his wife again in bed with the visitor.

At what point in this story will the husband feel angry? The answer depends on his culture (Hupka, 1981, 1991). A North American husband would feel rather angry at a wife who had an extramarital affair, and a wife would feel rather angry at being offered to a guest as if she were a lamb chop. But a Pawnee husband of the nineteenth century would be enraged at any man who dared ask his wife for water. An Ammassalik Inuit husband finds it perfectly honorable to offer his wife to a stranger, but only once; he would be angry to find his wife and the guest having a second encounter. And a century ago, a Toda husband in India would not be angry at

all because the Todas allowed both husband and wife to take lovers. Both spouses might feel angry though if one of them had a *sneaky* affair, without announcing it publicly.

In most cultures, people feel angry in response to insult and the violation of social rules, but as this story shows, they often disagree about what an insult is or what the correct rule should be. In this section, we will explore how culture influences the emotions we feel and the ways in which we express them.

## How Culture Shapes Emotions

Are some emotions specific to particular cultures and not found elsewhere? What does it mean that some languages have words for subtle emotional states that other languages lack? The Germans have *schadenfreude*, a feeling of joy at another's misfortune. The Japanese speak of *hagaii*, helpless anguish tinged with frustration. And Tahitians have *mehameba*, a trembling sensation that Tahitians feel when ordinary categories of perception are suspended—at twilight, in the brush, watching fires glow without heat (Levy, 1984). Do these interesting linguistic differences mean that Germans are more likely than others to actually feel *schadenfreude*, the Japanese to feel *hagaii*, and the Tahitians to feel *mehameba*? Or are they just more willing to give these subtle emotions a single name?

Many psychologists would say that all human beings are capable of feeling the primary, hardwired emotions, the ones that have distinctive physiological hallmarks in the brain, face, and nervous system. But individuals might indeed differ in their abilities to experience secondary emotions, including variations such as *schadenfreude*, *hagaii*, or *mehameba*.

The difference between primary emotions and more complex cultural variations is reflected in language all over the world. In Chapter 7, we noted that a *prototype* is a typical representative of a class of things. People everywhere consider the primary emotions to be prototypical examples of the concept *emotion*: Most people will say that *anger* and *sadness* are more representative of an emotion than *irritability* and *nostalgia* are. Prototypical emotions are reflected in the emotion words that young children learn first: *happy*, *sad*, *mad*, and *scared*. As children develop, they begin to draw emotional distinctions that are less prototypical and more specific to their language and culture, such as *ecstatic*, *depressed*, *hostile*, or *anxious* (Hupka, Lenton, & Hutchison, 1999; Shaver, Wu, & Schwartz, 1992). In this way, they come to experience the nuances of emotional feeling that their cultures emphasize.



Anger is considered a primary emotion in Western societies. But in some cultures, such as the Inuit, anger is not tolerated because it threatens the community's need for closeness. Inuit mothers like this one often calmly ignore an angry baby, conveying the message that complaining is not welcome. What emotions might be primary to the Inuit?

Other psychologists, however, don't think much of the primary–secondary distinction because, for them, there is *no* aspect of any emotion that is not influenced by culture or context or that even clearly separates one emotion from another (Barrett, 2006; Elfenbein & Ambady, 2003). Anger may be universal, but the way it is experienced will vary from culture to

culture—whether it feels good or bad, useful or destructive. Culture even affects which

emotions are defined as basic or primary. Anger is regarded as a primary emotion by Western psychologists, but in Asian cultures shame and loss of face are more central emotions (Kitayama & Markus, 1994). And on the Micronesian atoll of Ifaluk, everyone would say that *fago* is the most fundamental emotion. *Fago*, translated as “compassion/love/sadness,” reflects the sad feeling one has when a loved one is absent or in need, and the pleasurable sense of compassion in being able to care and help (Lutz, 1988).

Everyone agrees, however, that cultures determine much of what people feel emotional *about*. For example, disgust is universal, but the content of what produces disgust changes as an infant matures, and it varies across cultures (Rozin, Lowery, & Ebert, 1994). People in some cultures learn to become disgusted by bugs (which other people find beautiful or tasty), unfamiliar sexual practices, dirt, death, “contamination” by a handshake with a stranger, or particular foods (e.g., meat, if they are vegetarian; pork, if they are Muslims or Orthodox Jews).

## Communicating Emotions

Suppose that someone who was dear to you died. Would you cry, and if so, would you do it alone or in public? Your answer will depend in part on your

Thinking Critically  
about “Basic”  
Emotions





Around the world, the cultural rules for expressing emotions differ. The display rule for a formal Japanese wedding portrait is “no direct expressions of emotion,” but not every member of this family has learned that rule yet.

**display rules** Social and cultural rules that regulate when, how, and where a person may express (or suppress) emotions.

**emotion work** Expression of an emotion, often because of a role requirement, that a person does not really feel.

culture’s **display rules** for emotion (Ekman et al., 1987; Gross, 1998). In some cultures, grief is expressed by weeping; in others, by tearless resignation; and in still others by dance, drink, and song. Once you feel an emotion, how you express it is rarely a matter of “I say what I feel.” You may be obliged to disguise what you feel. You may wish you could feel what you say.

Even the smile, which seems a straightforward signal of friendliness, has many meanings and uses that are not universal. Americans smile more frequently than Germans, not because Americans are inherently friendlier but because they differ in their notions of when a smile is appropriate. After a German–American business meeting, the Americans often complain that the Germans were cold and aloof, and the Germans often complain that the Americans were excessively cheerful, hiding their real feelings under the mask of a smile (Hall & Hall, 1990). The Japanese smile even more than Americans do, to disguise embarrassment, anger, or other negative emotions whose public display is considered rude and incorrect.

Display rules also govern *body language*, non-verbal signals of body movement, posture, gesture, and gaze (Birdwhistell, 1970). Many aspects of body language are specific to particular languages and cultures, which makes even the simplest gesture subject to misunderstanding and offense. The

sign of the University of Texas football team, the Longhorns, is to extend the index finger and the pinkie. In Italy and other parts of Europe, it means you’re saying a man’s wife has been unfaithful to him—a serious insult.

Display rules tell us not only what to do when we are feeling an emotion, but also how and when to show an emotion we do not feel. Most people are expected to demonstrate sadness at funerals, happiness at weddings, and affection toward relatives. What if we don’t actually feel sad, happy, or affectionate? Acting out an emotion we do not really feel because we believe it is socially appropriate is called **emotion work**. It is part of our efforts to regulate our emotions when we are with others (Gross, 1998). Sometimes emotion work is a job requirement. Flight attendants, waiters, and customer-service representatives must put on a happy face to convey cheerfulness, even if they are privately angry about a rude or drunken customer. Bill collectors must put on a stern face to convey threat, even if they feel sorry for the person they are collecting money from (Hochschild, 2003).

## Gender and Emotion

“Women are too emotional,” men often complain. “Men are too uptight,” women often reply. This is a familiar gender stereotype. But what does “too emotional” mean? We need to define our terms and examine our assumptions. And we need to consider the larger culture in which men and women live, which shapes the rules and norms that govern how the sexes are supposed to behave.

Although women are more likely than men to suffer from clinical depression (see Chapter 11), there is little evidence that one sex feels any of the everyday emotions more often than the other, whether the emotion is anger, worry, embarrassment, anxiety, jealousy, love, or grief (Archer, 2004; Deffenbacher et al., 2003; Fischer et al., 1993; Harris, 2003; Kring & Gordon, 1998; Shields, 2005). The major difference between the sexes has less to do with whether they feel emotions than with how and when their emotions are expressed, and how they are perceived by others.

Consider anger. In Western cultures, both sexes unconsciously associate “angry” with male and “happy” with female. When researchers showed students a series of computer-generated, fairly sex-neutral faces with a range of expressions morphing from angry to happy, the students

Thinking Critically  
about Gender Stereo-  
types and Emotion



consistently rated the angry faces as being masculine and the happy faces as feminine (Becker et al., 2007). This stereotyped link between gender and emotion may explain why a man who expresses anger in a professional context is considered “high status,” but a professional woman who does exactly the same thing loses status. She is considered to be an angry person, someone “out of control” (Brescoll & Uhlmann, 2008). Powerful women thus often face a dilemma: express anger when a subordinate or adversary has done something illegal or incompetent (and risk being thought “overemotional”) or behave calmly (and risk being seen as “cold and unemotional”).

Conversely, women who don’t smile when others expect them to are often disliked, even if they are actually smiling as often as men would. This may be why North American women, on average, smile more than men do, gaze at their listeners more, have more emotionally expressive faces, use more expressive hand and body movements, and touch others more (DePaulo, 1992; Kring & Gordon, 1998). Women smile more than men to pacify others, convey deference to someone of higher status, or smooth over conflicts (Hess, Adams, & Kleck, 2005; Shields, 2005).

Women also talk about their emotions more than men do. They are far more likely to cry and to acknowledge emotions that reveal vulnerability and weakness, such as “hurt feelings,” fear, sadness, loneliness, shame, and guilt (Grossman & Wood, 1993; Timmers, Fischer, & Manstead, 1998). In contrast, most North American men express only one emotion more freely than women: anger toward strangers, especially other men. Otherwise, men are expected to control and mask negative

feelings. When they are worried or afraid, they are more likely than women to use vague terms, saying that they feel moody, frustrated, or on edge (Fehr et al., 1999).

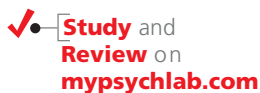
However, the influence of a particular situation often overrides gender rules (LaFrance, Hecht, & Paluck, 2003). You won’t find many gender differences in emotional expressiveness at a football game or the World Series! Another important situational constraint on emotional expression is the status of the participants (Snodgrass, 1992). A man is as likely as a woman to control his temper when the target of anger is someone with higher status or power; few people will readily sound off at a professor, police officer, or employer. And the sexes do similar emotion work when the situation or job requires it. A male flight attendant has to smile with passengers as much as a female attendant does, and a female FBI agent has to be as emotionally strong and controlled as a male agent does.

Even where gender differences exist, they are not universal. Italian, French, Spanish, and Middle Eastern men and women can have entire conversations using highly expressive hand gestures and facial expressions. In contrast, in Asian cultures, both sexes are taught to control emotional expression (Matsumoto, 1996; Mesquita & Frijda, 1992). Israeli and Italian men are more likely than women to mask feelings of sadness, but British, Spanish, Swiss, and German men are *less* likely than their female counterparts to inhibit this emotion (Wallbott, Ricci-Bitti, & Bänninger-Huber, 1986).

In sum, the answer to “Which sex is more emotional?” is: sometimes men, sometimes women, and sometimes neither, depending on the circumstances and their culture.



Both sexes feel emotionally attached to friends, but often they express their affections differently. From childhood on, girls tend to prefer “face-to-face” friendships based on shared feelings; boys tend to prefer “side-by-side” friendships based on shared activities.



## Quick Quiz

Please do not display anger if you miss a question.

1. In Western theories of emotion, anger would be called a \_\_\_\_\_ emotion, whereas *fago* would be called a \_\_\_\_\_ emotion.
2. Maureen is working in a fast-food restaurant and is becoming irritated with a customer who isn't ordering fast enough. She is supposed to be pleasant to all customers, but instead she snaps, "Hey, whaddaya want to order, slowpoke?" To keep her job and her temper, Maureen needs practice in \_\_\_\_\_.
3. In a class discussion, a student says something that embarrasses a student from another culture. The second student smiles to disguise his discomfort; the first student, thinking he is not being taken seriously, gets angry. This misunderstanding reflects the students' different \_\_\_\_\_ for the expression of embarrassment and anger.
4. *True or false:* Throughout the world, women are more emotionally expressive than men.

Answers:

1. primary, secondary 2. emotion work 3. display rules 4. false



## YOU are about to learn...

- how your body responds to physical, emotional, and environmental stressors.
- why being "stressed out" increases the risk of illness in some people but not others.
- how psychological factors affect the immune system.
- when having a sense of control over events is beneficial and when it is not.

## The Nature of Stress

The emotion "tree," as we have seen, can take many shapes, depending on physiology, cognitive processes, and cultural rules. These same three factors can help us understand those difficult situations in which negative emotions become chronically stressful, and in which chronic stress can create negative emotions.

When people say they are under stress, they mean all sorts of things: having recurring conflicts with a parent, feeling frustrated about their lives, fighting with a partner, feeling overwhelmed with caring for a sick child or keeping up with work obligations, or having just lost a job. Are these stressors linked to illness—to migraines, stomachaches, flu, or more life-threatening diseases such as cancer? And do they affect everyone in the same way?

**general adaptation syndrome** According to Hans Selye, a series of physiological reactions to stress occurring in three phases: alarm, resistance, and exhaustion.

## Stress and the Body

The modern era of stress research began in 1956, when physician Hans Selye published *The Stress of*

*Life*. Environmental stressors such as heat, cold, toxins, and danger, Selye wrote, disrupt the body's equilibrium. The body then mobilizes its resources to fight off these stressors and restore normal functioning. Selye described the body's response to stressors of all kinds as a **general adaptation syndrome**, a set of physiological reactions that occur in three phases:

**1 The alarm phase**, in which the body mobilizes the sympathetic nervous system to meet the immediate threat. The threat could be anything from taking a test you haven't studied for to running from a rabid dog. As we saw earlier, the release of adrenal hormones, epinephrine and norepinephrine, occurs with any intense emotion. It boosts energy, tenses muscles, reduces sensitivity to pain, shuts down digestion (so that blood will flow more efficiently to the brain, muscles, and skin), and increases blood pressure. Decades before Selye, psychologist Walter Cannon (1929) described these changes as the "fight or flight" response, a phrase still in use.



**2 The resistance phase**, in which your body attempts to resist or cope with a stressor that cannot be avoided. During this phase, the physiological

responses of the alarm phase continue, but these very responses make the body more vulnerable to other stressors. That is why, when your body has mobilized to deal with a heat wave or pain from a broken leg, you may find you are more easily annoyed by minor frustrations. In most cases, the body will eventually adapt to the stressor and return to normal.

**3** The **exhaustion phase**, in which persistent stress depletes the body of energy, thereby increasing vulnerability to physical problems and illness. The same reactions that allow the body to respond effectively in the alarm and resistance phases are unhealthy as long-range responses. Tense muscles can cause headache and neck pain. Increased blood pressure can become chronic hypertension. If normal digestive processes are interrupted or shut down for too long, digestive disorders may result.

Selye did not believe that people should aim for a stress-free life. Some stress, he said, is positive and productive, even if it also requires the body to produce short-term energy: competing in an athletic event, falling in love, working hard on a project you enjoy. And some negative stress is simply unavoidable; it's called life!

**Current Approaches** One of Selye's most important observations was that the very biological changes that are adaptive in the short run, because they permit the body to respond quickly to danger, can become hazardous in the long run (McEwen, 1998, 2007). Modern researchers are learning exactly how this happens.

When you are under stress, your brain's hypothalamus sends messages to the endocrine glands along two major pathways. One, as Selye observed, activates the sympathetic division of the autonomic nervous system for "fight or flight," producing the release of epinephrine and norepinephrine from

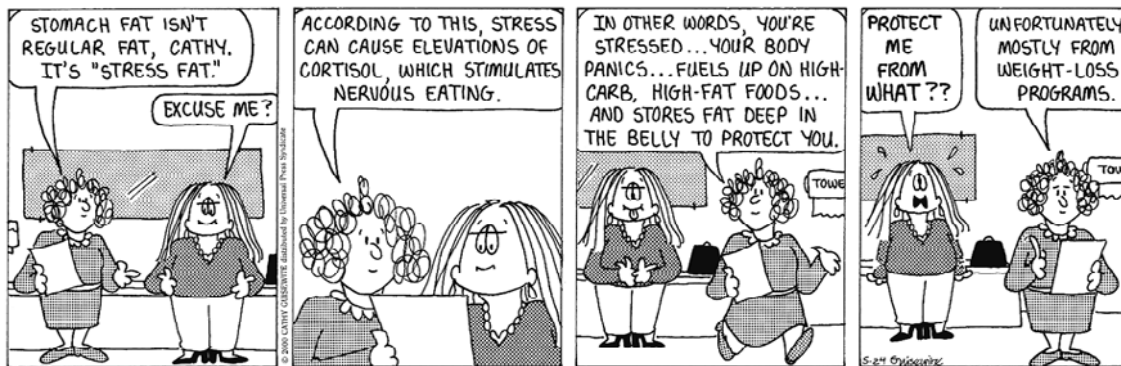


Most people think stress is something "out there" that just happens to them. However, there is another way of looking at stress: as something in you, something that depends on your thoughts and emotions. Do you see your work as an endless set of assignments you will never complete or as challenging tasks to master? The answer will affect how stressed you are.

the inner part (medulla) of the adrenal glands. In addition, the hypothalamus initiates activity along the **HPA axis** (HPA stands for hypothalamus-pituitary-adrenal cortex): The hypothalamus releases chemical messengers that communicate with the pituitary gland, which in turn sends messages to the outer part (cortex) of the adrenal glands. The adrenal cortex secretes *cortisol* and other hormones that elevate blood sugar and protect the body's tissues from inflammation in case of injury.

One result of HPA axis activation is increased energy, which is crucial for short-term responses to stress (Kemeny, 2003). But if cortisol and other stress hormones stay high too long, they can lead to hypertension, immune disorders, other physical ailments, and possibly emotional problems. Elevated

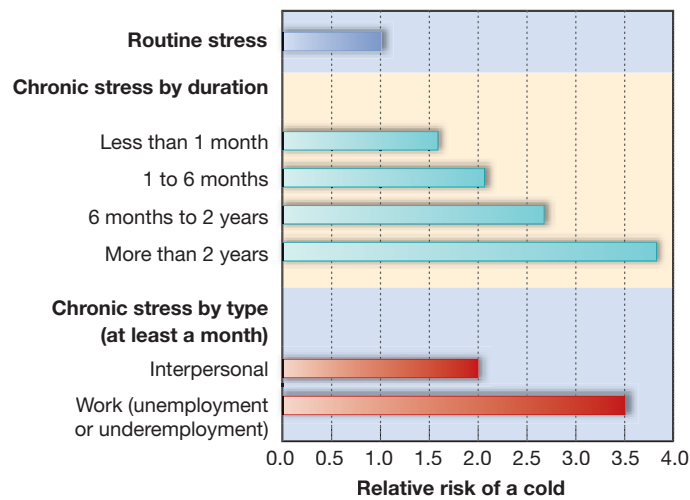
**HPA (hypothalamus-pituitary-adrenal cortex) axis** A system activated to energize the body to respond to stressors. The hypothalamus sends chemical messengers to the pituitary, which in turn prompts the adrenal cortex to produce cortisol and other hormones.



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Alas, the same stress hormones that help in the short run can have unwanted long-term consequences.





**FIGURE 13.3**  
**Stress and the Common Cold**

Chronic stress lasting a month or more boosts the risk of catching a cold. The risk is increased among people undergoing problems with their friends or loved ones; it is highest among people who are out of work (Based on data from Cohen et al., 1998).

levels of cortisol also motivate animals (and presumably humans, too) to seek out rich comfort foods and store the extra calories as abdominal fat.

An understanding of the cumulative effects of external sources of stress may partly explain why people at the lower rungs of the socioeconomic ladder have worse health and higher mortality rates for almost every disease and medical condition than do those at the top (Adler & Snibbe, 2003). In addition to their lack of access to good medical care and frequent reliance on diets that lead to obesity and diabetes, low-income people often live with continuous environmental stressors—higher crime rates, discrimination, fewer community services, rundown housing, and greater exposure to hazards such as chemical contamination (Gallo & Matthews, 2003). These conditions affect urban blacks disproportionately and may help account for their higher incidence of hypertension (high blood pressure), which can lead to kidney disease, strokes, and heart attacks (Clark et al., 1999).

Children are particularly vulnerable to the stressors associated with poverty: The more years they are exposed to family disruption, chaos, and instability, the higher their cortisol levels and the greater the snowballing negative effect on their physical health, mental health, and cognitive abilities (such as memory) in adolescence and adulthood (Chen, Cohen, & Miller, 2010; Evans & Kim, 2007; Evans & Schamberg, 2009).

Because work is central in most people's lives, the effects of persistent unemployment can threaten health for people at all income levels, even

increasing their vulnerability to the common cold. In one study, heroic volunteers were given either ordinary nose drops or nose drops containing a cold virus, and then were quarantined for five days. The people most likely to get a cold's miserable symptoms were those who had been underemployed or unemployed for at least a month. As you can see in Figure 13.3, the longer the work problems lasted, the greater the likelihood of illness (Cohen et al., 1998).

Nonetheless, the physiological changes caused by stress do not occur to the same extent in everyone. People's responses to stress vary according to their learning history, gender, preexisting medical conditions, and genetic predisposition for high blood pressure, heart disease, obesity, diabetes, or other health problems (Belsky & Pluess, 2009b; McEwen, 2000, 2007; Roysamb et al., 2003). This is why some people respond to the same stressor with much greater increases in blood pressure, heart rate, and hormone levels than other individuals do, and their physical changes take longer to return to normal. These hyperresponsive individuals may be the ones most at risk for eventual illness.

**The Immune System: PNI** Researchers in the growing field of *health psychology* (and its medical relative, behavioral medicine) investigate all aspects of how mind and body affect each other to preserve wellness or cause illness. Some have formed an interdisciplinary specialty with the cumbersome name **psychoneuroimmunology**, or **PNI** for short. The “psycho” part stands for psychological

**psychoneuroimmunology (PNI)** The study of the relationships among psychology, the nervous and endocrine systems, and the immune system.





The immune system consists of fighter cells that look more fantastical than any alien creature Hollywood could design. This one is about to engulf and destroy a cigarette-shaped parasite that causes a tropical disease.

processes such as emotions and perceptions; “neuro” for the nervous and endocrine systems; and “immunology” for the immune system, which enables the body to fight disease and infection.

PNI researchers are especially interested in the white blood cells of the immune system, which are designed to recognize foreign or harmful substances (*antigens*), such as flu viruses and bacteria, and then destroy or deactivate them. The immune system deploys different kinds of white blood cells as weapons, depending on the nature of the enemy. Natural killer cells are important in tumor detection and rejection, and are involved in protection against the spread of cancer cells and viruses. Helper T cells enhance and regulate the immune response; they are the primary target of the HIV virus that causes AIDS. Chemicals produced by the immune cells are sent to the brain, and the brain in turn sends chemical signals to stimulate or restrain the immune system. Anything that disrupts this communication loop, whether drugs, surgery, or chronic stress, can weaken or suppress the immune system (Segerstrom & Miller, 2004).

Some PNI researchers have gotten right down to the level of cell damage to see how stress can lead to illness, aging, and even premature death. At the end of every chromosome is a protein complex called a *telomere* that, in essence, tells the cell how long it has to live. Every time a cell divides, en-

zymes whittle away a tiny piece of the telomere; when it is reduced to almost nothing, the cell stops dividing and dies. Chronic stress, especially if it begins in childhood, appears to shorten the telomeres (Epel, 2009). One team of researchers compared two groups of healthy women between the ages of 20 and 50: 19 who had healthy children and 39 who were primary caregivers of a child chronically ill with a serious disease, such as cerebral palsy. Of course, the mothers of the sick children felt that they were under stress, but they also had significantly greater cell damage than did the mothers of healthy children. In fact, the cells of the highly stressed women looked like those of women at least ten years older, and their telomeres were much shorter (Epel et al., 2004).  **Simulate**

 **Simulate Stress and Health** on [myspsychlab.com](http://myspsychlab.com)

## Stress and the Mind

Before you try to persuade your instructors that the stress of constant studying is bad for your health, consider this mystery: The large majority of individuals who are living with stressors, even serious ones such as loss of a job or the death of a loved one, do not get sick (Bonanno, 2004; Taylor, Reptetti, & Seeman, 1997). What protects them?

**Optimism and Pessimism** When something bad happens to you, what is your first reaction? Do you tell yourself that you will somehow come through it okay, or do you gloomily mutter, “More proof that if something can go wrong for me, it will?” In a fundamental way, optimism—the general expectation that things will go well in spite of occasional setbacks—makes life possible. If people are in a jam but believe things will get better



**locus of control** A general expectation about whether the results of your actions are under your own control (internal locus) or beyond your control (external locus).

eventually, they will keep striving to make that prediction come true. Even despondent fans of the Chicago Cubs, who have not won the World Series in living memory, maintain a lunatic optimism that “there’s always next year.”

In general, optimism is better for your health and well-being than pessimism is (Carver & Scheier, 2002; Geers, Wellman, & Lassiter, 2009). This does not mean that an optimistic outlook will always prolong the life of a person who already has a serious illness: A team of Australian researchers who followed 179 patients with lung cancer over a period of eight years found that optimism made no difference in who lived or in how long they lived (Schofield et al., 2004). But optimism does seem to produce good health and even improved immune function in people without life-threatening illnesses, whereas the “catastrophizing” style of pessimists is associated with untimely death (Maruta et al., 2000; Peterson et al., 1998; Segerstrom & Sephton, 2010).

One reason is that optimists simply take better care of themselves. They do not deny their problems or avoid facing bad news; rather, they regard the problems and bad news as difficulties they can overcome. They are more likely than pessimists to be active problem solvers, get support from friends, and seek information that can help them (Brisette, Scheier, & Carver, 2002; Chang, 1998; Geers, Wellman, & Lassiter, 2009). They keep their senses of humor, plan for the future, and reinterpret the situation in a positive light. Pessimists, in contrast, often do self-destructive things: They drink too much, smoke, fail to wear seat belts, drive too fast, and refuse to take medication for illness (Peterson et al., 1998).

Pessimists naturally accuse optimists of being unrealistic, and often that is true. Yet health and well-being often depend on having some “positive illusions” about yourself, your abilities, and your circumstances (Taylor et al., 2000a). Can pessimists be cured of their gloomy outlook? Optimists think so! One way is by teaching pessimists to follow the oldest advice in the world: to count their blessings instead of their burdens. Even among people with serious illnesses, such as a neuromuscular disease, a focus on the positive aspects of life increases well-being and reduces the number of physical symptoms they report (Emmons & McCullough, 2003).

**A Sense of Control** Optimism is related to another important cognitive ingredient in health, **locus of control**, which refers to your general expectation about whether you can control the things that happen to you (Rotter, 1990). People who have an *internal locus of control* (“internals”) tend to believe that they are responsible for what happens to them. Those who have an *external locus of control* (“externals”) tend to believe that their lives are controlled by luck, fate, or other people. Having an internal locus of control is associated with good health, academic achievement, political activism, and emotional well-being (Lang & Heckhausen, 2001; Strickland, 1989).

Most people can tolerate all kinds of stressors if they feel able to predict or control them. Take crowding. Mice get really nasty when they’re crowded, but many people love crowds, voluntarily getting squashed in New York’s Times Square on New Year’s Eve or at a rock concert. Human beings show signs of stress not when they are actually



Who has more stress: corporate managers in highly competitive jobs or assembly-line workers in routine and predictable jobs? People who are bossed suffer more from job stress than their bosses do, especially if the employees cannot control many aspects of their work (Karasek & Theorell, 1990).

crowded but when they *feel* crowded (Evans, Lepore, & Allen, 2000). Cortisol is also elevated when people feel that they are being judged negatively by others or have no control over the task at hand (Dickerson & Kemeny, 2004; Miller, Chen, & Zhou, 2007). People who have the greatest control over their work pace and activities, such as executives and managers, have fewer illnesses and stress symptoms than do employees who have little control, who feel trapped doing repetitive tasks, and who have a low chance of promotion (Karasek & Theorell, 1990). The greatest threat to health and well-being occurs when people feel caught in a situation they cannot escape, one that goes on without a foreseeable end.

Feeling in control affects the immune system, which may be why it helps to speed up recovery from surgery and some diseases (E. Skinner, 1996). People who have an internal locus of control are better able than externals to resist infection by cold viruses and even the health-impairing effects of poverty and discrimination (Cohen, Tyrrell, & Smith, 1993; Krieger & Sidney, 1996; Lachman & Weaver, 1998). As with optimism, feeling in control also makes people more likely to take action to improve their health when necessary. In a group of patients recovering from heart attacks, those who believed the heart attack occurred because they smoked, didn't exercise, or had a stressful job were more likely to change their bad habits and recover quickly. In contrast, those who thought their illness was due to bad luck or fate—factors outside their control—were less likely to generate plans for recovery and more likely to resume their old unhealthy habits (Affleck et al., 1987; Ewart, 1995).

Overall, a sense of control is a good thing, but critical thinkers might want to ask: Control over what? It is surely not beneficial for people to believe they can control absolutely every aspect of their lives; some things, such as death, taxes, or being a random victim of a crime, are out of anyone's control. Health and well-being are not enhanced by self-blame (“Whatever goes wrong with my health is my fault”) or the belief that all disease can be prevented by doing the right thing (“If I take vitamins and hold the right positive attitude, I'll never get sick”).



**Thinking Critically about Control and Health**

**Culture and Control** Eastern and Western cultures tend to hold different attitudes toward the ability and desirability of controlling one's own life. In general, Western cultures celebrate **primary**

**control**, in which people try to influence events by trying to exert direct control over them: If you are in a bad situation, you change it, fix it, or fight it. The Eastern approach emphasizes **secondary control**, in which people try to accommodate to a bad situation by changing their own aspirations or desires: If you have a problem, you live with it or act in spite of it (Rothbaum, Weisz, & Snyder, 1982).

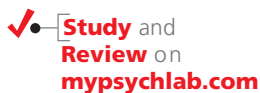
A Japanese psychologist once offered some examples of Japanese proverbs that teach the benefits of yielding to the inevitable (Azuma, 1984): *To lose is to win* (giving in, to protect the harmony of a relationship, demonstrates the superior trait of generosity); *willow trees do not get broken by piled-up snow* (no matter how many problems pile up in your life, flexibility will help you survive them); and *the true tolerance is to tolerate the intolerable* (some “intolerable” situations are facts of life that no amount of protest will change). You can imagine how long “To lose is to win” would survive on an American football field, or how long most Americans would be prepared to tolerate the intolerable! Yet an important part of coping, for any of us, is learning to accept limited resources, irrevocable losses, and circumstances over which we have little or no direct influence—all aspects of secondary control (E. Skinner, 2007).

People who are ill or under stress can reap the benefits of both Western and Eastern forms of control by avoiding either—or thinking: taking responsibility for future actions while not blaming themselves unduly for past ones. Among college freshmen who are doing poorly in their classes, future success depends on maintaining enough primary control to keep working hard and learning to study better, *and* on the ability to come to terms with the fact that success is not going to drop into their laps without effort (Hall et al., 2006). Among women who are recovering from sexual assault or coping with cancer, adjustment is related to a woman's belief that she is not to blame for being raped or for getting sick but that she *is* in charge of taking care of herself from now on (Frazier, 2003; Taylor, Lichtman, & Wood, 1984). “I felt that I had lost control of my body somehow,” said one cancer survivor, “and the way for me to get back some control was to find out as much as I could.” This way of thinking allows people to avoid guilt and self-blame while retaining a belief that they can take steps to get better.

Many problems require us to decide what we can change and to accept what we cannot; perhaps the secret of healthy control lies in knowing the difference.

**primary control** An effort to modify reality by changing other people, the situation, or events; a “fighting back” philosophy.

**secondary control** An effort to accept reality by changing your own attitudes, goals, or emotions; a “learn to live with it” philosophy.



## Quick Quiz

We hope these questions are not sources of stress for you.

1. Steve is unexpectedly called on in class to discuss a question. He hasn't the faintest idea of the answer, and he feels his heart pound and his palms sweat. According to Selye, Steve is in the \_\_\_\_\_ phase of his stress response.
2. Maria has worked as a file clerk for 17 years in a job that is closely supervised and boring. Her boss must make many rapid-fire decisions every day and is always complaining of the pressures of responsibility. Which of them probably has the more stressful job? (a) Maria, (b) the boss, (c) both equally, (d) neither job is stressful (*Bonus: Why?*)
3. Anika usually takes credit for doing well on her work assignments and blames her failures on lack of effort. Benecia attributes her successes to luck and blames her failures on the fact that she is an indecisive Gemini. Anika has an \_\_\_\_\_ locus of control whereas Benecia has an \_\_\_\_\_ locus.
4. Adapting to the reality that you have a chronic medical condition is an example of (primary/secondary) control; joining a protest to make a local company clean up its hazardous wastes is an example of (primary/secondary) control.
5. On television, a self-described health expert explains that “no one gets sick if they don't want to be sick,” because we can all control our bodies. As a critical thinker, how should you assess this claim?



Answers:

1. alarm 2. a, because Maria has less control than her boss does over every aspect of her work 3. internal; external 4. secondary; primary 5. First, you would want to define your terms: What does “control” mean, and what kind of control is the supposed expert referring to? People can control some things, such as how much they exercise and whether they smoke, and they can control some aspects of treatment once they become ill, but they cannot control everything that happens to them. Second, you would examine the assumption that control is always a good thing: the belief that we have total control over our lives could lead to depression and unwarranted self-blame when illness strikes.



## YOU are about to learn...

- which emotion may be most hazardous to your heart.
- whether chronic depression leads to physical illness.
- why confession is often as healthy for the body as it is for the soul.

## Stress and Emotion

Perhaps you have heard people say things such as “She was so depressed, it’s no wonder she got sick” or “He’s always so angry, he’s going to give himself a heart attack one day.” Are negative emotions, especially anger and depression, hazardous to your health?

First, we can eliminate the popular belief that there is a “cancer-prone” personality. (This notion was initially promoted by the tobacco industry to draw attention away from smoking as a leading cause of cancer.) Research has thoroughly discredited this belief; studies of thousands of people around the world, from Japan to Finland, have found no link between personality traits and risk of cancer (Nakaya et al., 2003).

Second, we need to separate the effects of negative emotions on healthy people from the effects of such emotions on people who are ill. Once a person is already sick, negative emotions such as anxiety and helplessness can affect the speed of recovery (Kiecolt-Glaser et al., 1998). People who become depressed after a heart attack are significantly more likely to die from cardiac causes in the succeeding year, even controlling for severity of the disease and other risk factors (Frasure-Smith et al., 1999). But can anger and depression be causes of illness on their own?

## Hostility and Depression: Do They Hurt?

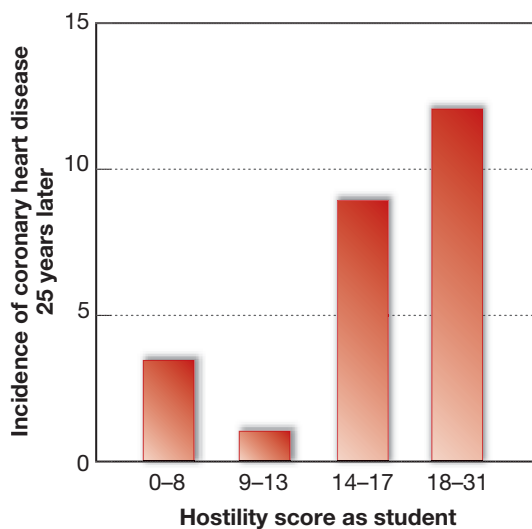
One of the first modern efforts to link emotions and illness occurred in the 1970s, with research on the “Type A” personality, a set of qualities thought to be associated with heart disease: ambitiousness, impatience, anger, working hard, and having high standards for oneself. Later work ruled out all of these factors except one: The toxic ingredient in the Type A personality turned out to be hostility (Myrtek, 2007).

By “hostility” we do not mean the irritability or anger that everyone feels on occasion, but *cynical* or *antagonistic hostility*, which characterizes people who are mistrustful of others and always ready to provoke mean, furious arguments. In a classic study of male physicians who had been interviewed as medical students 25 years earlier, those who were chronically angry and resentful were five times as likely as nonhostile men to get heart disease, even when other risk factors such as smoking and a poor diet were taken into account (Ewart & Kolodner, 1994; Williams, Barefoot, & Shekelle, 1985) (see Figure 13.4). These findings have been replicated in other large-scale studies, with African Americans

and whites, and with women as well as men (Krantz et al., 2006; Williams et al., 2000). Proneness to anger is a significant risk factor all on its own for impairments of the immune system, elevated blood pressure, heart disease, and even a slower healing of wounds (Chida & Hamer, 2008; Gouin et al., 2008; Suinn, 2001).

Clinical depression, too, is linked to at least a doubled risk of later heart attack and cardiovascular disease (Frasure-Smith & Lespérance, 2005; Schulz et al., 2000). But what accounts for that link? One prospective study of more than 1,000 men found that the answer was exercise: The depressed men who had further episodes were less physically active than men who exercised regularly (Whooley et al., 2008). But another large prospective study found no differences in physical activity between depressed and nondepressed older adults. Instead, they found that depressed people were more likely to accumulate fat in the belly and midriff (perhaps because of the elevated cortisol that often occurs with depression), where it is more likely to increase the risk of diabetes and cardiovascular disease (Vogelzangs et al., 2008). Either way, you can see that the reason depression might lead to heart disease over time is not depression itself, but more likely the lethargy and overeating that depression can produce in some of its sufferers.

For some time, researchers thought that depression might also lead to cancer, but now it looks as though cancer can cause depression, and not just because the diagnosis is “depressing.” Cancerous tumors, as well as the immune system that is fighting them, produce high levels of a chemical that can cause the emotional and behavioral symptoms of depression. A study of rats, which after all are not aware of having cancer, found that the animals would float passively in water instead of swimming for safety, and show other signs of anxiety and apathy (Pyter et al., 2009).



**FIGURE 13.4**  
**Hostility and Heart Disease**

Anger is more hazardous to health than a heavy workload. Men who had the highest hostility scores as young medical students were the most likely to have coronary heart disease 25 years later (Williams, Barefoot, & Shekelle, 1985).

## Positive Emotions: Do They Help?

Just as negative emotions can be unhealthful, positive emotions seem to be healthful (Fredrickson et al., 2003). Consider the findings from a study of 180 Catholic nuns. Researchers examined autobiographies composed by the nuns when the women were about 22 years old, to see whether the quality of their writing predicted the onset of Alzheimer’s disease later in life. (It did.) When other researchers scored the writings for their emotional content, they found a strong association between the frequency of positive emotions described—such




Hostility is hazardous, but humor is healthful!

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as happiness, love, hope, gratitude, contentment, amusement—and longevity six decades later (Danner, Snowdon, & Friesen, 2001). The nuns whose life stories contained the most words describing positive emotions lived, on average, nine years longer than nuns who reported the fewest positive feelings. These differences in longevity could not have been due to the stress of poverty, raising children, or particular experiences. The women all had the same experiences and standard of living, at least after they entered the convent.

Psychologists are trying to find out just what it is about feeling happy, cheerful, and hopeful that could protect a person from getting sick. Of course, perhaps the cheerfulness of the long-lived nuns simply reflected an easygoing temperament or other genetic influences that promote long life. But positive emotions could also be physically beneficial because they soften or counteract the high arousal caused by negative emotions or chronic stressors. They may dispose people to think more creatively about their opportunities and choices and to take action to achieve their goals (Kok, Catalino, & Frederickson, 2008). People who express positive feelings are also more likely to attract friends and supporters than are people who are always bitter and brooding, and, as we will see, social support contributes to good health (Pressman & Cohen, 2005).

If you don't feel bouncy and happy all the time, don't worry; everyone feels grumpy, irritable, and unhappy on occasion. But according to one study in which college students kept a daily diary of their positive and negative emotions for 28 days, the students who had the greatest emotional well-being

had a ratio of positive to negative emotions of at least 3 to 1 (Fredrickson & Losada, 2005). You might want to keep track of your own positive-to-negative emotion ratio for the next month to see where yours falls, and whether it seems related to any colds, flu, or other physical symptoms you might be having. Are positive emotions more typical of your emotional life than negative ones, or is it the other way around?  **Explore**

## Emotional Inhibition and Expression

Well, then, if positive emotions are beneficial and negative emotions are risky, you might assume that the safest thing to do when you feel angry, depressed, or worried is to try to suppress those feelings. But anyone who has tried to banish an unwelcome thought, a bitter memory, or pangs of longing for an ex-lover knows how hard it can be to do this. When you are trying to avoid a thought, you are in fact processing the thought more frequently; you are rehearsing it. That is why, when you are obsessed with someone you were once romantically involved with, trying not to think of the person actually prolongs your emotional responsiveness to him or her (Wegner & Gold, 1995).

The continued inhibition of thoughts and emotions actually requires physical effort that can be stressful to the body. People who are able to express matters of great emotional importance to them show elevated levels of disease-fighting white blood cells, whereas people who suppress such feelings tend to have decreased levels (Petrie, Booth, & Pennebaker, 1998). There is also a social cost to suppressing important feelings. In a longitudinal study that followed first-year college students as they adjusted to being in a new environment, those who expressed their worries and fears openly with other students ended up with better relationships and greater satisfaction, compared to those those who said they preferred to keep their emotions to themselves (Srivastava et al., 2009).

**The Benefits of Confession** Given the findings on the harmful effects of feeling negative emotions and also the difficulty and costs of suppressing them, what is a person supposed to do with them? One way to reduce the wear and tear of negative emotions comes from research on the benefits of confession: divulging (even if only to yourself) private thoughts and feelings that make you ashamed, worried, or sad (Pennebaker, 2002). Freshmen who wrote about their “deepest thoughts and feelings” in a private journal reported greater short-term

Everyone has secrets and private moments of sad reflection, but when you feel sad or fearful for too long, keeping your feelings to yourself may increase your stress.



## Get Involved! True Confessions

To see whether the research on confession will benefit you, take a moment to write down your deepest thoughts and feelings about being in college, your past, a secret, your future . . . anything you have never told anyone. Do this again tomorrow and then again for a few days in a row. Note your feelings after writing. Are you upset, troubled, sad, or relieved? Does your account change over time? Research suggests that if you do this exercise now, you may have fewer colds, headaches, and trips to the doctor over the next few months (Pennebaker, Colder, & Sharp, 1990).

homesickness and anxiety, compared to students who wrote about trivial topics. But by the end of the school year, they had had fewer bouts of flu and fewer visits to the infirmary than the control group did (Pennebaker, Colder, & Sharp, 1990).

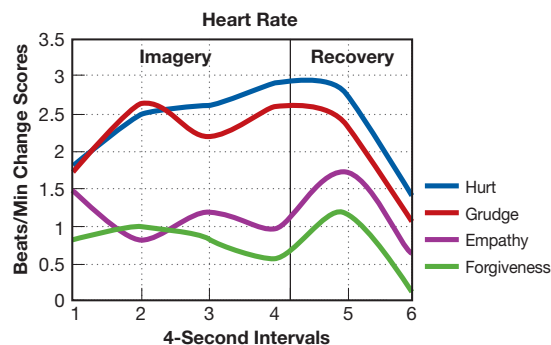
This method is especially powerful when people write about traumatic experiences. When a group of college students was asked to write about a personal, traumatic experience for 20 minutes a day for four days, many told stories of sexual coercion, physical beatings, humiliation, or parental abandonment. Yet most had never discussed these experiences with anyone. The researchers collected data on the students' physical symptoms, white blood cell counts, emotions, and visits to the health center. On every measure, the students who wrote about traumatic experiences were better off than those who wrote only about neutral topics (Pennebaker, Kiecolt-Glaser, & Glaser, 1988). Expressing and working through memories of traumatic events head on are more beneficial than trying to suppress intrusive, troubling thoughts (Dalgleish, Hauer, & Kuyken, 2008).

The benefits of this method occur primarily when the revelation produces insight and understanding, thereby ending the stressful repetition of obsessive thoughts and unresolved feelings (Kennedy-Moore & Watson, 2001; Lepore, Ragan, & Jones, 2000). One young woman, who had been molested at the age of 9 by a boy a year older, at first wrote about her feelings of embarrassment and guilt. By the third day, she was writing about how angry she felt at the boy. By the last day, she had begun to see the whole event differently; he was a child too, after all. When the study was over, she said, "Before, when I thought about it, I'd lie to myself. . . . Now, I don't feel like I even have to think about it because I got it off my chest. I finally admitted that it happened."

**The Benefits of Letting Grievances Go**  
Another way of letting go of negative emotions is to

give up the thoughts that produce them and adopt a perspective that might lead to forgiveness. When people rehearse their grievances and hold on to their grudges, their blood pressure, heart rate, and skin conductance rise. Forgiving thoughts (as in the preceding example, "He was a child too") reduce these signs of physiological arousal and restore feelings of control (Witvliet, Ludwig, & Vander Laan, 2001). (See Figure 13.5.) Forgiveness, like confession when it works, helps people see events in a new light. It promotes empathy, the ability to see the situation from another person's perspective. It strengthens and repairs relationships (Karremans et al., 2003).

Forgiveness does *not* mean that the offended person denies, ignores, or excuses the offense, which might be serious. It does mean that the victim is able, finally, to come to terms with the injustice and let go of obsessive feelings of hurt, rage, and vengefulness. As the Chinese proverb says, "He who pursues revenge should dig two graves."



**FIGURE 13.5**  
**Heartfelt Forgiveness**

Participants in this study were asked to think of someone who they felt had offended or hurt them. Then they were asked to imagine unforgiving reactions (rehearsing the hurt and harboring a grudge) and forgiving reactions (feeling empathy, forgiving). People's heart rates increased much more sharply, and took longer to return to normal, when their thoughts were unforgiving.



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## Quick Quiz

We'll never forgive you if you skip this quiz.

1. Which aspect of Type A behavior is most hazardous to the heart? (a) working hard, (b) being in a hurry, (c) cynical hostility, (d) irritability in traffic, (e) general grumpiness
2. Amber has many worries about being in college, but she is afraid to tell anyone. What might be the healthiest solution for her? (a) trying not to think about her feelings, (b) writing down her feelings and then rereading and rethinking what she wrote, (c) talking frequently to anyone who will listen, (d) tweeting her friends about her moods
3. We are giving away an answer to #2, but why might answer *d* not be helpful to Amber?



Answers:

1. c 2. b 3. Sending tweets, or posting her feelings on her Facebook page, might make Amber momentarily feel good, but she probably won't retrieve those messages later to reread and rethinking about what she wrote; and rethinking her story is the important element.



## YOU are about to learn...

- ways of calming the body when you are feeling stressed.
- the difference between emotion-focused and problem-focused coping.
- how to reduce stress by rethinking and reappraising your problems.
- the importance and limitations of social support.

## Coping with Stress

We have noted that most people who are under stress, even those living in difficult situations, do not become ill. In addition to feeling optimistic and in control, and not wallowing around in negative emotions, how do they manage to cope?

The most immediate way to deal with the physiological tension of stress and negative emotions is to take time out and reduce the body's physical arousal. Many people, from infants to the old, respond beneficially to the soothing touch of massage (Moyer, Rounds, & Hannum, 2004). Another successful method is the ancient Buddhist practice of *mindfulness meditation*, which fosters emotional tranquility. The goal is to learn to accept feelings of anger, sadness, or anxiety

without judging them or trying to get rid of them (a form of secondary control) (Davidson et al., 2003). A third effective buffer between stressors and illness is exercise. People who are physically fit have fewer health problems than people who are less fit even when they are under the same pressures. They also show lower physiological arousal to stressors (Vita et al., 1998). These activities, along with any others that calm your body and focus your mind—including prayer, music, dancing, or baking bread—are all good for health. But if your house has burned down or you need a serious operation, other coping strategies will be necessary.

✱ **Explore**

## Solving the Problem

Years ago, at the age of 23, a friend of ours named Simi Linton was struck by tragedy. Linton, her new husband, and her best friend were in a horrific car accident. When she awoke in a hospital room, with only a vague memory of the crash, she learned that her husband and friend had been killed and that she herself had permanent spinal injury and would never walk again.

How in the world does anyone recover from such a devastating event? Some people advise survivors of disaster or tragedy to “get it out of your system” or to “get in touch with your feelings.” But survivors know they feel miserable. What should they *do*? This question gets to the heart of the difference between *emotion-focused* and *problem-focused coping* (Lazarus, 2000; Lazarus & Folkman, 1984). Emotion-focused coping concentrates on the emotions the problem has caused, whether anger, anxiety, or grief. For a period of time after any tragedy or disaster, it is normal to give in to these emotions

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These exuberant performers know all about coping—and thriving.



and feel overwhelmed by them. In this stage, people often need to talk constantly about the event, which helps them come to terms with it, make sense of it, and decide what to do about it (Lepore, Ragan, & Jones, 2000).

Eventually, most people become ready to concentrate on solving the problem itself. The specific steps in problem-focused coping depend on the nature of the problem: whether it is a pressing but one-time decision; a continuing difficulty, such as living with a disability; or an anticipated event, such as having an operation. Once the problem is identified, the copier can learn as much as possible about it from professionals, friends, books, and others in the same predicament (Clarke & Evans, 1998). Becoming informed increases the feeling of control and can speed recovery (Doering et al., 2000).

As for Simi Linton, she learned how to do just about everything in her wheelchair (including dancing!), and she went back to school. She got a Ph.D. in psychology, remarried, and became a highly respected teacher, counselor, writer, and activist committed to improving conditions and opportunities for people with disabilities (Linton, 2006).

## Rethinking the Problem

Some problems cannot be solved; these are the unavoidable facts of life, such as an inability to have children, losing your job, or developing a chronic illness. Now what? Health psychologists have identified three effective cognitive coping methods:

**1 Reappraising the situation.** Although you may not be able to get rid of a stressor, you can choose to think about it differently, a process called *reappraisal*. Reappraisal can turn anger into sympathy, worry into determination, and feelings of loss into feelings of opportunity. Maybe that job you lost was dismal but you were too afraid to quit and look for another; now you can. Reappraisal improves well-being, softens negative emotions, and even lowers cortisol and other stress responses (Denson, Spanovic, & Miller, 2009; Gross & John, 2003; Moskowitz et al., 2009).

**2 Learning from the experience.** Some people emerge from adversity with newfound or newly acquired skills, having been forced to learn something they had not known before—say, how to cope with the medical system or how to manage a deceased parent's estate. Others discover sources of courage and strength they did not know they had. Those who draw lessons from the inescapable tragedies of life, and find meaning in them, thrive

as a result of adversity instead of simply surviving it (Davis, Nolen-Hoeksema, & Larson, 1998; Folkman & Moskowitz, 2000).

**3 Making social comparisons.** In a difficult situation, successful copiers often compare themselves to others who they feel are less fortunate. Even if they have fatal diseases, they find someone who is worse off (Taylor & Lobel, 1989; Wood, Michela, & Giordano, 2000). One AIDS patient said in an interview, “I made a list of all the other diseases I would rather not have than AIDS. Lou Gehrig’s disease, being in a wheelchair; rheumatoid arthritis, when you are in knots and in terrible pain.” Sometimes successful copiers also compare themselves to those who are doing better than they are (Collins, 1996). They might say, “She and I have the same kinds of problems; how come she’s doing so much better in school than I am? What does she know that I don’t?” Such comparisons provide a person with information about ways of coping, managing an illness, or improving a stressful situation (Suls, Martin, & Wheeler, 2002).

## Drawing on Social Support

A final way to deal with negative emotions and stress is to reach out to others. Your health depends not only on what is going on in your body and mind but also on what is going on in your relationships: what you take from them, and what you give to them. When social groups provide individuals with a sense of meaning, purpose, and belonging, they produce positive psychological benefits for their members’ health and well-being (Haslam et al., 2009).

**When Friends Help You Cope . . .** Think of all the ways in which family members, friends, neighbors, and co-workers can help you. They can offer concern and affection. They can help you evaluate problems and plan a course of action. They can offer resources and services such as lending you money or a car, or taking notes in class for you when you are sick. Most of all, they are sources of attachment and connection, which everyone needs throughout life.

Friends can even improve your health. As we saw, work-related stress and unemployment increase a person’s vulnerability to the common cold, but having a lot of friends and social contacts helps to reduce that risk (Cohen et al., 2003). Social support is especially important for people who have stressful jobs that require high cardiovascular responsiveness day after day, such as firefighters.



Friends can be our greatest source of warmth, support, and fun . . .

Having social support helps the heart rate and stress hormones return to normal more quickly after a stressful episode (Roy, Steptoe, & Kirschbaum, 1998).

People who live in a network of close connections actually live longer than those who do not. In studies that followed thousands of adults for ten years, people who had many friends, connections, or memberships in church and other groups lived longer on average than those who had few. The importance of having social networks was unrelated to physical health at the time the studies began, to socioeconomic status, and to risk factors like smoking (House, Landis, & Umberson, 2003).

When social support comes from a loving partner, its benefits for the immune system can be quite powerful. In one study of 16 couples, the wives had to lie in an MRI machine, periodically receiving a mild but stressful electric shock on their ankle (Coan, Schaefer, & Davidson, 2006). During the procedure, some women received a touch on the hand from a stranger; others held hands with their husbands. The women's brain images showed activation in the hypothalamus and other regions involved with pain, physical arousal, and negative emotions. Yet, as you can see in Figure 13.6, the moment the women felt a husband's reassuring hand, their brain activation subsided in all the regions that had been revved up to cope with threat and fear. Holding hands with a stranger, while comforting, did not produce as great a decrease in brain activation as did a husband's touch.

When a touch is affectionate and welcome, it can actually elevate some “therapeutic” hormones, especially *oxytocin*, the hormone that induces relaxation and is associated with mothering and attachment. In fact, human bodies may be designed not only for a “fight or flight” response to stress and challenge, but also a “tend and befriend” response—being friendly and conciliatory, seeking out a friend or loved one, taking care of others (Taylor, 2006; Taylor et al., 2000b). Animal studies find that early nurturing by parents or other adults who “tend and befriend” the young can affect the sensitivity of the HPA axis, making the infants more resilient to later chronic stressors. Such findings may help explain why children who lack such nurturing become physically more vulnerable to illness (Young & Francis, 2008). Oxytocin might even be the key link between hugging and lower blood pressure, in men as well as women (Grewen et al., 2005).

However, once again it is important not to oversimplify, for instance by concluding that people can defeat any illness if they just have the right amount and kind of social support. Some years ago, a psychiatrist claimed, on the basis of a preliminary study, that women with advanced breast cancer lived longer if they joined support groups, but the study has been discredited and was never replicated (Coyne et al., 2009). Therapy does not prolong survival, although it often is emotionally and socially beneficial to individual members.

Moreover, not all cultural groups define “social support” the same way or benefit from the same kind. Asians and Asian Americans are more reluctant than white Americans to ask for help explicitly from friends, colleagues, and family and to disclose feelings of distress. Being particularly attuned to the harmony of their relationships, many Asians are concerned about the potentially negative and embarrassing effects of self-disclosure or of seeking help. As a result, they often feel more stressed and have elevated stress hormones when they are required to ask for help or reveal their private feelings (Kim, Sherman, & Taylor, 2008). But Asians do not differ from Anglos in their reliance on, and need for, *implicit* social support—the knowledge that someone will be there to help if they need it.

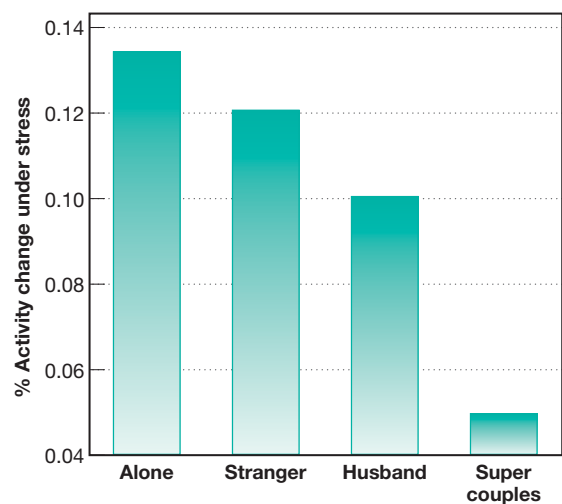


FIGURE 13.6  
Hugs and Health

Women had to lie in an MRI machine while receiving mild but stressful shocks on their ankle. Those who showed the highest activation of the hypothalamus and other regions of the brain involved in stress and anxiety went through the test alone. A stranger's calming touch reduced activation somewhat and a husband's touch reduced it even more. The women in “super couples,” who felt the closest to their husbands (right bar), showed the lowest signs of stress (Coan, Schaefer, & Davidson, 2006).

**. . . And Coping with Friends** Needless to say, sometimes other people aren't helpful. Sometimes they themselves are the source of unhappiness, stress, and anger.

In close relationships, the same person who is a source of support can also become a source of stress, especially if the two parties are arguing all the time. Being in an unhappy, bitter, uncommunicative relationship can significantly impair health. It makes the partners depressed and angry, affects their health habits, elevates stress hormones, and also directly influences their cardiovascular, endocrine, and immune systems (Kiecolt-Glaser & Newton, 2001). Married couples who argue in a hostile fashion—criticizing, interrupting, or insulting the other person, and becoming angry and defensive—show significant elevations of cortisol and poorer immune function afterward. In fact, any wounds or blisters a hostile couple has actually heal more slowly than they do in couples who do not argue in a hostile way (Kiecolt-Glaser et al., 2005). Couples who argue in a positive fashion—trying to find common ground, compromising, listening to each other's concerns, and using humor to defuse tension—do not show these impairments. As one student of ours observed, "This study gives new meaning to the accusation 'You make me sick!'"

In addition to being sources of conflict, friends and relatives may be unsupportive in times of trouble simply out of ignorance or awkwardness. They may abandon you or say something stupid and hurtful. Sometimes they actively block your efforts to change bad health habits such as binge drinking or smoking by

making fun of you or pressuring you to conform to what "everyone" does. And sometimes, because they have never been in the same situation and do not know what to do to help, they offer the wrong kind of support. They may try to cheer you up, saying, "Everything will be fine," rather than let you talk about your fears or find solutions, or they may try to press you to join a support group "for your own good," even if you regard disclosing your feelings in groups as culturally or personally inappropriate for you.

Finally, we should not forget the benefits of giving support, rather than always being on the receiving end. Julius Segal (1986), a psychologist who worked with Holocaust survivors, hostages, refugees, and other survivors of catastrophe, wrote that a key element in their recovery was compassion for others: "healing through helping." Why? The ability to look outside yourself is related to all of the successful coping mechanisms we have discussed. It encourages you to solve problems instead of blaming others or just venting your emotions, helps you reappraise the situation by seeing it from another person's perspective, fosters forgiveness, and allows you to gain perspective on your own problems (Brown et al., 2003). Healing through helping thus helps everyone to accept difficult situations that are facts of life.



. . . and also sources of exasperation, anger, and misery.

## Quick Quiz

Can you cope with these questions?

1. You accidentally broke your glasses. Which response is an example of cognitive reappraisal? (a) "I am such a stupid, clumsy idiot!" (b) "I never do anything right." (c) "What a shame, but I've been wanting new frames anyway." (d) "I'll forget about it in aerobics class."
2. Finding out what your legal and financial resources are when you have been victimized by a crime is an example of (a) problem-focused coping, (b) emotion-focused coping, (c) distraction, (d) reappraisal.
3. "This class drives me crazy, but I'm better off than my friends who aren't in college" is an example of (a) distraction, (b) social comparison, (c) denial, (d) empathy.
4. What hormone is elevated when happy couples hug one another?
5. Your roommate has turned your room into a garbage dump, filled with rotten leftover food and unwashed clothes. Assuming that you don't like living with rotting food and dirty clothes, what coping strategies described in this section might help you?

Answers:

1. c 2. a 3. b 4. oxytocin 5. You might solve the problem by finding a compromise (e.g., cleaning the room together). You could reappraise the seriousness of the problem ("I only have to live with this person until the end of the term") or compare your roommate to others who are worse ("At least mine is generous and friendly"). And you might mobilize some social support, perhaps by offering your friends a pizza if they help you clean up.

✓ Study and Review on [mypsychlab.com](http://mypsychlab.com)



# Psychology in the News REVISITED



**J**oe Stack, whose story opened this chapter, burned down his house, with callous disregard for his wife and young stepdaughter, and then killed himself and two IRS employees. In the rant he posted on the Internet, he wrote: “Violence not only is the answer, it is the only answer.” Really? What did it accomplish?

As we saw in this chapter, when we are feeling extreme emotions or when major stressors require the body to cope with threat, fear, or danger, the body whirls into action to give us the energy to respond. Just about everyone has had the unpleasant experience of a racing heart, sweaty palms, and other emotional symptoms when we feel betrayed, anxious, or angry. But does that mean we have no control over our emotions, especially those caused by extremely stressful experiences?

As we also saw, biology does not give us the whole picture. It is equally important to understand the role of perceptions, beliefs, and expectations in generating emotions and stress. Joe Stack blamed the IRS for his financial losses, and his rage resulted from his perception that he was an undeserving victim. But what if he had been able to interpret his problems differently? What if he had been able to evaluate, calmly and perhaps with the help of a financial planner or psychotherapist, the reasons he was in trouble, and perhaps had come to understand and accept his own responsibility for his misfortunes? What beliefs made him feel entitled to retire at a relatively young age, when millions of others work hard their whole lives, through hard times as well as boom times?

The findings on the stressful nature of bitter marital relationships may also be relevant to Stack’s life. His cruel act of burning down their house certainly suggests he was blaming his wife for his misery as much as he blamed the government. But marital disputes involve two people, and it’s rare that one partner is 100 percent to blame. What if he had been able to understand his own role in creating his unhappiness in his marriage?

This chapter also examined the importance of having a sense of control over events, noting the helplessness and panic that can ensue when people lose their feelings of control. Westerners, particularly, tend to have a philosophy of fighting back against unwelcome events rather than of accepting disappointments and

losses. Stack would appear to have been an extreme example of this stance toward the world: feeling helpless and unable to control his life, he did not know what else to do other than end it in a blaze of fury.

Yet we saw that there are better ways of coping than by murdering your partner or employees of the institution that you think is causing your stress and anger. Stack could surely have found a way to improve his marriage and his financial situation without committing murder and suicide. These include rethinking the problem, learning from it, comparing oneself to others less fortunate, helping others, and finding a good support group. (“Taking Psychology with You” offers suggestions for handling anger.)

In the final analysis, successful coping does not mean eliminating all sources of stress or all difficult emotions. It does not mean constant happiness or a life without pain and frustration. The healthy person faces problems, deals with them, and gets beyond them, but the problems are necessary if the person is to acquire coping skills that endure. To wish for a life without stress, or a life without emotion, would be like wishing for a life without friends. The result might be calm, but it would be joyless. Daily hassles, chronic problems, and occasional tragedies are inescapable. How we handle them is the test of our humanity.



The ultimate example of rethinking your problems.

# Taking Psychology with You

## The Dilemma of Anger: “Let It Out” or “Bottle It Up”?

What do you do when you feel angry? Do you tend to brood and sulk, collecting your righteous complaints like acorns for the winter, or do you erupt, hurling your wrath upon anyone or anything at hand? Do you discuss your feelings when you have calmed down? Does “letting anger out” get rid of it for you, or does it only make it more intense? The answers are crucial for how you get along with your family, neighbors, employers, and strangers.

Critical thinkers can learn to think carefully about how and when to express anger, and make a calm decision on how to proceed. Chronic feelings of anger and an inability to control anger can be as emotionally devastating and unhealthy as chronic problems with depression or anxiety. Yet in contrast to much pop-psych advice, research shows that expressing anger does not always get it “out of your system”; often people feel worse, physically and mentally, after an angry confrontation. When people brood and ruminate about their anger, talk to others incessantly about how angry they are, or ventilate their feelings in hostile acts, their blood pressure shoots up, they often feel angrier, and they behave even *more* aggressively later than if they had just let their feelings of anger subside (Bushman et al., 2005; Tavis, 1989). Conversely, when people learn to control their tempers and express anger constructively, they usually feel better, not worse; calmer, not angrier.

When people are feeling angry, they have a choice of doing any number of things, some of which will be more beneficial than others. Some people sulk, expecting everyone else to read their minds, which is hardly a way to communicate clearly. Many post impulsive comments on blogs that have annoyed them or send nasty texts on the spur of the moment. Some scream abuses at their friends or family, or strike out physically. If a particular action soothes their feelings or gets the desired response from others, they are likely to acquire a habit. Soon that habit feels “natural,” as if it could never be changed. Some habits are better than others, though! Baking bread or going for a jog is fine, whereas many people justify their violent tempers by saying, “I couldn’t help myself.” But they can. If you

have acquired an abusive or aggressive habit, the research in this chapter offers practical suggestions for learning constructive ways of managing anger:

**Don’t sound off in the heat of anger; let bodily arousal cool down.** Whether your arousal comes from background stresses such as heat, crowds, or loud noise or from conflict with another person, take time to relax. Time allows you to decide whether you are really angry or just tired and tense. This is the reason for the sage old advice to count to 10, count to 100, or sleep on it. Other cooling-off strategies include taking a time-out in the middle of an argument, meditating or relaxing, and calming yourself with a distracting activity.

**Don’t take it personally.** If you feel that you have been insulted, check your perception for its accuracy. Could there be another reason for the behavior you find offensive? People who are quick to feel anger tend to interpret other people’s actions as intentional offenses. People who are slow to anger tend to give others the benefit of the doubt, and they are not as focused on their own injured pride. Empathy (“Poor guy, he’s feeling rotten”) is usually incompatible with anger, so practice seeing the situation from the other person’s perspective.

**Beware of road rage—yours and the other person’s.** Driving increases everyone’s level of physiological arousal, but not everyone becomes a hotheaded driver. Some drivers make themselves angry by having vengeful and retaliatory thoughts about other drivers (who have the nerve to change lanes or want to park! Who dare to drive at the speed limit in a school zone!). Hotheaded drivers take more risks while driving (rapidly switching lanes in their impatience), behave more aggressively (swearing, giving other drivers the finger or cursing them), and have more accidents (Deffenbacher et al., 2003).

**If you decide that expressing anger is appropriate, be sure you use the right verbal and nonverbal language to make yourself understood.** Because cultures (and families) have different display rules, be sure the recipient of your

anger understands what you are feeling and what complaint you are trying to convey—and whether or not the person thinks your anger is *appropriate*. For example, a study compared the use of anger by Asian-American and Anglo-American negotiators. Expressing anger was effective for the Anglo teams—it got more concessions from the other side—but was much less effective for the Asian negotiators (Adam, Shirako, & Maddux, 2010).

**Think carefully about how to express anger so that you will get the results you want.** What do you want your anger to accomplish? Do you just want to make the other person feel bad, or do you want the other person to understand your concerns and make amends? Shouting “You moron! How *could* you be so stupid!” might accomplish the former goal, but it’s not likely to get the person to apologize, let alone to change his or her behavior. If your goal is to improve a bad situation or achieve justice, learning how to express anger so the other person will listen is essential.

Of course, if you just want to blow off steam, go right ahead; but you risk becoming a hothead.



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# Summary Listen to an audio file of your chapter on [myspsychlab.com](https://myspsychlab.com)

## The Nature of Emotion

- Although negative emotions are often painful, emotions evolved to bind people together, motivate them to achieve their goals, and help them make decisions and plans. The experience of *emotion* involves physiological changes in the face, brain, and autonomic nervous system; cognitive processes; and cultural norms and regulations. *Primary emotions* are thought to be universal, whereas *secondary emotions* are specific to cultures.
- Some basic facial expressions—anger, fear, sadness, happiness, disgust, surprise, contempt, and possibly pride—are widely recognized across cultures. They foster communication with others, signal our intentions to others, enhance infant survival, and, as studies of *facial feedback* show, help us to identify our own emotional states. An accurate reading of others' facial expressions increases among members of the same ethnicity, and depends on the social context. Also, because people can and do disguise their emotions, their expressions do not always communicate accurately.
- Many aspects of emotion are associated with specific parts of the brain. The *amygdala* is responsible for initially evaluating the emotional importance of incoming sensory information and is especially involved in fear. The *cerebral cortex* provides the cognitive ability to override this initial appraisal. Emotions generally involve the motivation to approach or withdraw; regions of the *left* prefrontal cortex appear to be specialized for the motivation to approach others (as with happiness and anger), whereas regions of the *right* prefrontal region are specialized for withdrawal or escape (as with disgust and fear).
- *Mirror neurons* throughout the brain are activated when people observe others. These neurons are involved in empathy, imitation, synchrony, understanding another person's intentions, and *mood contagion*.
- During the experience of any emotion, *epinephrine* and *norepinephrine* produce a state of physiological arousal to prepare the body for an output of energy. Different emotions are also associated with different patterns of autonomic nervous system activity.
- The most popular method of “lie detection” is the *polygraph machine*, but it has low reliability and validity because there are no patterns of autonomic nervous system activity specific to lying; it has a high rate of labeling innocent people as guilty. Other methods, such as voice analyzers or brain scans, have similar drawbacks.
- Cognitive approaches to emotion emphasize the perceptions and *attributions* that are involved in different emotions. Thoughts and emotions operate reciprocally,

each influencing the other. Some emotions involve simple, nonconscious reactions; others, such as shame and guilt, require complex cognitive capacities.

## Emotion and Culture

- Many psychologists believe that all human beings share the ability to experience primary emotions, whereas secondary emotions may be culture-specific—a view supported by research on emotion *prototypes*. But others believe that culture affects every aspect of emotional experience, including which emotions are considered basic and what people feel emotional about.
- Culture strongly influences the *display rules*, including nonverbal *body language*, that regulate how and whether people express their emotions. *Emotion work* is the effort a person makes to display an emotion he or she does not feel but feels obliged to convey.
- Women and men are equally likely to feel all emotions, although gender rules shape differences in emotional expression. North American women on average are more expressive than men, except for anger at strangers. But both sexes are less expressive to a person of higher status than they, both sexes will do the emotion work their job requires, and some situations foster expressiveness in everybody. Gender differences vary across cultures.

## The Nature of Stress

- The relationship between emotions and stress is both physiological and psychological. Chronic negative emotions can become chronically stressful, and chronic stress can create negative emotions.
- Hans Selye argued that environmental stressors such as heat, pain, and danger produce a *general adaptation syndrome*, in which the body responds in three stages: *alarm*, *resistance*, and *exhaustion*. If a stressor persists, it may overwhelm the body's ability to cope, and illness may result. Modern research has added to Selye's work. When a person is under stress or in danger, the hypothalamus sends messages to the endocrine glands along two major pathways. One activates the sympathetic division of the autonomic nervous system, releasing adrenal hormones from the inner part of the adrenal glands. In the other, the hypothalamus initiates activity along the *HPA axis*. Chemical messengers travel from the hypothalamus to the pituitary, and in turn to the outer part (cortex) of the adrenal glands. The adrenal cortex secretes *cortisol* and other hormones that increase energy. Excess levels of cortisol can become harmful if they persist over time.

- When the stressors of poverty and unemployment become chronic, they can increase people's stress levels and increase their chances of illness. Responses to stress differ across individuals, depending on the type of stressor and the individual's own genetic predispositions.
- *Health psychologists* and researchers in the interdisciplinary field of *psychoneuroimmunology* (PNI) are studying the interaction among psychological factors, the nervous and endocrine systems, and the immune system (particularly the white blood cells that destroy harmful foreign bodies, called *antigens*). Chronic stress can even shorten *telomeres*, a protein that determines cell life.
- Psychological factors affect people's responses to stress. Feeling optimistic rather than pessimistic and having an *internal locus of control* improve immune function and also increase a person's ability to tolerate pain, live with ongoing problems, and recover from illness. Cultures differ in the kind of control they emphasize and value: *primary control*, trying to change a stressful situation, or *secondary control*, learning to accept and accommodate to a stressful situation.

## Stress and Emotion

- Researchers have sought links between emotions, stress, and illness. There is no "cancer-prone personality," but chronic anger, especially in the form of *cynical* or *antagonistic* hostility, is a strong risk factor in heart disease. Major depression also increases the risk of later heart disease. Positive emotions appear related to well-being, better health, and longevity.
- People who consciously suppress their emotions are at greater risk of illness than people who acknowledge and cope with negative emotions. The effort to suppress worries, secrets, and memories of upsetting

experiences can become stressful to the body. Two ways of letting go of negative emotions include confession and forgiveness. The goal is to achieve insight and understanding, and let go of grudges.

## Coping with Stress

- The first step in coping with stress and negative emotions is to reduce their physical effects, such as through relaxation, *mindfulness meditation*, and exercise. The second is to focus on solving the problem (*problem-focused coping*) rather than on venting the emotions caused by the problem (*emotion-focused coping*). A third approach is to rethink the problem, which involves *reappraisal*, learning from the experience, and comparing oneself to others.
- *Social support* is essential in maintaining physical health and emotional well-being; it even prolongs life and speeds recovery from illness. A touch or a hug from a supportive partner calms the alarm circuits of the brain and raises levels of *oxytocin*, which may result in reduced heart rate and blood pressure. However, friends and family can also be sources of stress. In close relationships, couples who fight in a hostile and negative way show impaired immune function. Giving support to others is also associated with health and hastens recovery from traumatic experiences.

## Psychology in the News, Revisited

- We may not always be able to control the physiological arousal produced by stress or intense emotions, but we generally are able to decide how to behave when we are upset. Coping with stress does not mean trying to live without pain or problems. It means learning how to live with them.

## Key Terms

emotion	434	body language	444	internal versus external locus of control	450
primary emotions	434	emotion work	444	primary versus secondary control	451
secondary emotions	434	general adaptation syndrome (Selye)	446	cynical/antagonistic hostility	453
facial feedback	435	alarm, resistance, and exhaustion phases of stress	446, 447	emotional inhibition	454
amygdala	437	HPA axis	447	mindfulness meditation	456
mirror neurons	438	cortisol	447	emotion-focused coping	456
mood contagion	438	health psychology	448	problem-focused coping	456
epinephrine	439	psychoneuroimmunology (PNI)	448	reappraisal	457
norepinephrine	439	antigens	449	social comparison	457
attributions	441	telomere	449	social support	457
emotion prototypes	443			oxytocin	458
display rules	444				



# The Nature of Emotion

Emotion involves physiological changes in the face, brain, and autonomic nervous system; cognitive interpretations of events; and tendencies toward action, all influenced by cultural norms.

## Emotion and the Body

- **Primary emotions** are biologically based and thought to be universal.
  - **Secondary emotions** include all the variations and blends of emotion that vary from one culture to another.
- Some facial expressions are recognized across cultures and thus seem to reflect a key set of primary emotions: anger, fear, sadness, happiness, disgust, surprise, contempt, and possibly pride.

## Emotion and the Mind

- People's perceptions, beliefs, and interpretations of events generate different emotions.
- Some emotions are cognitively primitive.
  - As the cortex matures, cognitions become more complex, permitting the emergence of more complex and self-conscious emotions such as shame and guilt.

## Emotion and Culture

- Most psychologists believe that all human beings share the ability to experience primary emotions.
- Some psychologists believe that culture affects every aspect of emotional experience.

## Communicating Emotions

- **Display rules** regulate how and whether people show emotion.
- *Body language* communicates emotions nonverbally.
- **Emotion work** is the effort to display an emotion a person does not feel because it is socially appropriate or required.

## Biology and Deception

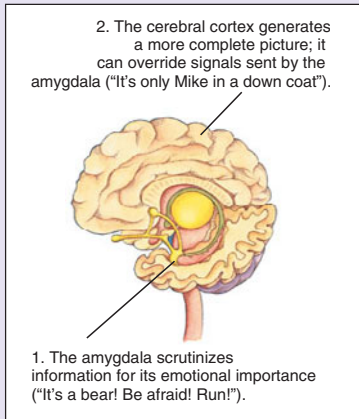
- The polygraph machine is assumed to detect lies, but it is actually a measure of emotional arousal.
- Polygraphs often correctly identify liars and guilty people, but their main problem is their high rate of falsely accusing innocent people of lying.
- No current technology exists that can directly and reliably determine whether someone is telling a falsehood.

Functions of facial expressions include:

- Identifying our own emotions through **facial feedback**
- Communicating emotion
- Allowing us to lie about our true feelings

Brain areas associated with emotion:

- The amygdala evaluates incoming emotion, especially anger and fear.



- The left prefrontal cortex specializes in approach motivation and positive emotions; the right prefrontal cortex specializes in escape and negative emotions.
- **Mirror neurons** are brain cells that are activated when an animal or person observes others doing a specific task; they are involved in empathy, imitation, nonverbal rapport, and mood contagion.

During experience of any emotion, two hormones produce a state of arousal: epinephrine and norepinephrine.

## Gender and Emotion

- The sexes do not differ in how often they feel the range of everyday emotions.
- North American women are more verbally and nonverbally expressive than men.
- Men are more likely to express anger at strangers.

Situations can override gender rules:

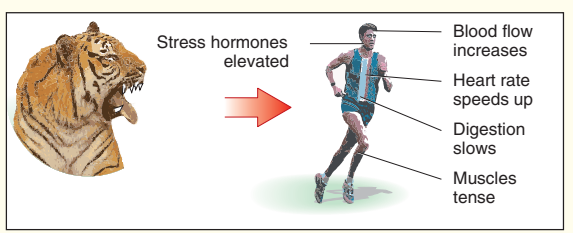
- Both sexes are less expressive to a person of higher status.
- Both sexes do "emotion work" associated with their jobs.
- Some situations foster emotion in everybody.
- Gender differences vary across cultures.

# The Nature of Stress

## Stress and the Body

Hans Selye argued that environmental stressors produce a **general adaptation syndrome**, physiological reactions that occur in three phases:

1. Alarm
2. Resistance
3. Exhaustion



## The Immune System: PNI

Researchers interested in **psychoneuroimmunology** study how psychological factors and physical changes, such as different levels of immune system functioning, interact with one another to protect health or increase the risk of illness.

### Physical Changes

When a person is under stress, the hypothalamus sends messages to the endocrine glands along two major pathways to:

1. Activate the sympathetic nervous system for “fight or flight”
2. Initiate activity along the **HPA axis** to release chemical messengers that spur production of *cortisol* and other hormones to release energy

Chronic stressors that affect the immune system and increase the risk of illness include:

- Unemployment and work-related problems
- Poverty, powerlessness, and low status

### Psychological Factors

Two psychological factors that can increase a person’s ability to tolerate pain, live with ongoing problems, and recover from illness:

- Being optimistic
- Having an internal **locus of control**

Health and well-being may depend on a combination of:

- **Primary control**, trying to change the stressful situation
- **Secondary control**, learning to accept and to accommodate to the stressful situation

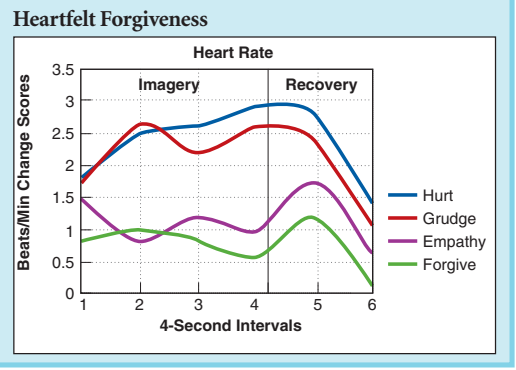
## Stress and Emotion

Emotional factors that increase the risk of heart disease and other illness:

- Cynical or antagonistic hostility
- Chronic depression
- Prolonged inhibition of negative emotions

Two ways of letting go of negative emotions:

1. Confession: revealing private thoughts and feelings
2. Forgiveness: coming to terms with the injustice



## Coping with Stress

1. Reducing the physical effects of negative emotions and stress, such as through massage, meditation, relaxation, and exercise
2. Relying on problem-focused coping rather than emotion-focused coping
3. Rethinking the problem:
  - Reappraising the situation
  - Learning from the experience
  - Comparing yourself to others
4. Drawing on social support or giving it to others can speed recovery from illness, although the wrong kind of social support can be detrimental.